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DICTIONARY

OF

PRACTICAL MEDICINE:

COMPRISING

GENERAL PATHOLOGY,

THE NATURE AND TREATMENT OF DISEASES,

MORBID STRUCTURES,

AND THE DISORDERS ESPECIALLY INCIDENTAL TO CLIMATES, TO THE SEX,
AND TO THE DIFFERENT EPOCHS OF LIFE;

WITH

Numerous Prescriptions for the Medicines recommended.

A CLASSIFICATION OF DISEASES ACCORDING TO PATHOLOGICAL PRINCIPLES;

A COPIOUS BIBLIOGRAPHY, WITH REFERENCES;

AND

AN APPENDIX OF APPROVED FORMULÆ;

THE WHOLE FORMING A LIBRARY OF PATHOLOGY AND PRACTICAL MEDICINE, AND A
DIGEST OF MEDICAL LITERATURE.

BY

JAMES COPLAND, M.D. F.R.S.

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A

DICTIONARY

OF

PRACTICAL MEDICINE.

GALL BLADDER AND DUCTS.— Syn. *Biliary Passages; Channels of the Excretion of Bile. La Vesicule et les Canaux du Fiel; Les Voies d'Excretion de la Bile*, Andral. *Die Gallenblasse, Die Gallengang*, Germ.

Classif.— General Pathology—*Morbid Structure:* Special Pathology.

1. The intimate connection, anatomically and physiologically, existing between the liver — the organ secreting the bile, and the digestive canal —the organ for whose functions the bile is chiefly destined, necessarily involves the passages which convey it from the former into the latter, as well as the reservoir of this secretion, in many of the diseases seated in either the one or the other. The affections of the liver, whether functional or structural, are thus often extended to the gall-bladder and ducts; and those of the stomach and duodenum not infrequently proceed in an opposite direction, to the same parts. But the bile itself may excite disease, in the parts through which it passes, and in which it is for a time retained. It will, however, be necessary to take a view of the alterations observed of this secretion, before noticing the effect they sometimes produce in the biliary passages.

I. Of the Alterations of the Bile.

2. The changes of the bile have been found independent of any alteration in the liver, or in the gall-bladder or ducts; and, in most of the lesions of these parts, the bile has been unaltered in appearance, or in quantity, and most probably also in quality. It would seem, therefore, that the most apparent and the most serious lesions of the liver, are not always those which most derange the secreting action of this organ. The conditions which most affect the state of this fluid are such as are either beyond our powers of observation, or seated in the blood. Indeed, there is every reason to suppose that the liver performs, as I many years ago argued in another work, an eliminating function as respects the blood; and that it separates elements from this source, which would be injurious if allowed to accumulate, and elaborates them into a secretion necessary to digestion and assimilation. Alterations in the quality and quantity of the bile, therefore, in a great measure depend upon the blood, and upon the quantity of those constituents which the liver eliminates from this fluid and elaborates into this peculiar secretion.

3. *A.* The only alterations which can be detected in the bile upon simple *inspection*, are differences in *colour* and in *consistence*.—*a.* It presents every shade of *colour*, from a whitish pale straw colour, to the deepest black. The lightest tints have been most frequently observed in cases of anæmia, or chlorosis, or where the blood has been thin, watery, pale, or devoid of red particles—the liver being small, pale, and containing little blood. The dark colour is most common where the blood is thick, dark, or black, and abundant; and when the liver is congested, and the biliary passages loaded with bile.—*b.* The *consistence* of this secretion varies from the fluidity of water, to the thickness of half-melted glue, or of tar, or even of pitch. The deeper its colour, the greater is its consistence; but there are numerous exceptions to this.

4. *B. Chemical analysis* shows that the constituents of the bile vary greatly in their proportions. As the liver approaches more completely to the fatty condition, the more entirely is the bile deprived of its resinous elements. It sometimes, particularly in cases of fatty liver, consists chiefly or almost entirely of water and albumen. In other instances, the yellow matter, the resin, or the cholesterine is the predominant principle. It is this change in the proportions of the component parts of the bile that gives rise to its consistence, as well as to *Biliary* Concretions (see that article).

5. *C. Physiological experiments*, and *various diseases*, evince material alterations in the *qualities* of the bile. This secretion, taken from some dead bodies, produces no other inconvenience, when introduced into a living animal, than a slight local irritation; whilst that taken from others occasions much more serious consequences, and even death itself. In some cases it may be tasted with impunity; in others it produces pustules, ulcers, or vesications on the tongue and lips. It has been observed, in dissections of persons who have died of pestilential yellow fever (see Pestilence), that the bile has excited a painful or burning sensation, followed by excoriation of such parts of the examiner as had come in contact with it. A similar effect is not infrequently produced in the rectum, and around the anus, from the passage of bile which has been long retained and accumulated in the biliary passages. Numerous other proofs of an increased acrimony of this fluid, arising either from the state in which it is secreted, or from changes that have taken place in it during its retention, might be adduced, if they were required.

6. From these considerations it may be inferred —(*a*) that accumulations of this secretion, in either the gall-bladder or ducts, will arise from impaired contractility, or from mechanical obstruction at the outlets, or from the viscid or morbid state of the secretion itself;—(*b*) that the bile itself will some-

times occasion very serious disease in the gall-bladder or ducts, owing to an acrimony acquired by it in the way just stated (§ 2.); — and (*c*) that, when the bile is thus accumulated or retained, as well as altered in quality, the consequent disorder, either in the biliary passages, or in the digestive canal, when it has reached the latter situation, will be the more severe. — The difficulty, however, of forming a correct opinion as to the complaint, when the gall-bladder or ducts are its seats, should not be forgotten; for, owing to the relations noticed above (§ 1.), it often is impossible to distinguish disease of either the one or the other, from that of the liver or duodenum, unless the passage of bile into the intestines is altogether interrupted; and even then the exact nature and extent of lesion are equally difficult of recognition.

II. Inaction of the Gall-bladder and Ducts. — *Accumulation of Bile in the Gall-bladder and Ducts from local Asthenia.*

Classif. — I. Class, I. Order (*Author*).

7. Charact. — *Fulness, weight, or uneasiness in the epigastrium and hypochondrium; flatulence or symptoms of dyspepsia; a pale, slightly lurid, or muddy complexion; scanty or morbid excretion of bile in the stools, frequently with debility and depression of mind.*

8. i. When the functions of the liver, or those of the stomach and duodenum, are impaired, the gall-bladder and ducts necessarily participate in the disorder; and the bile is liable to accumulate in them.—The accumulation may arise from one or more of the following conditions: — 1st. Impaired tonic contractility of the coats of the gall-bladder, and perhaps also of the ducts.— 2d. A congested or tumefied state of the mucous membrane at the outlet of the common duct, and in the duodenum. — 3d. Inspissation of the bile in the gall-bladder and ducts, from the morbid state of the secretion, or from the absorption of its more fluid parts, whilst retained in these situations. — 4th. Spasm of the ducts themselves: — and, 5th. Temporary or constant occlusion of the ducts from inflammation, or from the presence of biliary calculi, either in them or in the gall-bladder.

9. *A.* The *first* of these pathological states is of frequent occurrence, in a moderate degree. When the contractility of the coats of the biliary passages, or of the gall-bladder, is impaired, in connection with torpor of the liver, and debility of the stomach and duodenum, the bile is imperfectly excreted, or it accumulates in these situations. The consequent distension, or the irritating properties the bile acquires by the retention, or some other cause, excites the contractility of these parts, and occasions the collected secretion to be thrown into the duodenum, where it produces more or less disorder, owing to its acridity, and to the very intimate and extensive relations of this intestine with the rest of the œconomy. When the bile has thus accumulated, a very gentle aperient will often be the cause of a violent action on both the stomach and bowels; this secretion, particularly if rendered acrid by long retention, and by the influence of temperature or season, giving rise to all the characters of bilious cholera, when its rapid flow into the duodenum has been thus procured.

10. *B.* That congestion, or a tumefied condition, of the mucous membrane of the duodenum will occasion accumulations of bile in the ducts and gall-bladder, is at least extremely probable; for the aperture of the common duct in this viscus being thereby narrowed, a diminished discharge of bile into it will result, particularly if this secretion be thicker or more viscid than natural. — In cases, therefore, of acute or chronic duodenitis, or of irritation of the internal surface of the duodenum, particularly if there also exist spasm either of this viscus or of the common duct, an impeded or interrupted flow of bile into the digestive canal, with consequent accumulation of it throughout the biliary passages, with or without jaundice, will very generally supervene. (See art. Duodenum, § 12.)

11. *C.* That the bile becomes inspissated and often more acrid, by retention in any of its passages, may likewise be conceded. The fact is even demonstrated, not only by observation during the life of the patient, but also by the appearances after death. In such cases, it is with some difficulty that the secretion can be forced along the ducts, or from the gall-bladder along the cystic canal. In an inactive state of the liver, the hepatic ducts are unable to discharge the bile which passes into them; and this fluid, during its collection and retention, is liable to be partially absorbed. Owing to this absorption, or to the state of the secretion at the time of its production, or to both, inspissation, viscidity, and increased acrimony of it may take place before it passes out of the liver, or reaches the larger ducts or gall-bladder; and even *concretions* may form in it from the same circumstances, in any of these situations. (See art. Concretions — *Biliary.*)

12. *D.* Spasm of the common or cystic duct may give rise to retention, and be followed by the same series of changes as have been just mentioned; but the evidence of the occurrence of spasm is much less complete than that of the other pathological states. It seems, however, probable that the passage of an acrid secretion along the cystic and common ducts, will so irritate them as to give rise to spastic constriction of them. This effect is produced upon other canals by irritating matters; and it may therefore be inferred, that a similar result will accrue in this situation from the operation of these agents. That it does occasionally take place, has been demonstrated in some instances by *post mortem* inspections. — That inflammation of the ducts is often followed by accumulation of bile in the gall-bladder and hepatic ducts, will be shown hereafter; it may, however, be stated, that a persistence, or a higher grade, of the same cause — the acridity of the bile — as sometimes occasions spasm or constriction of the ducts, will even induce inflammation of them and its consequences. —It has been often found, upon examination after death, that collections of bile have arisen from tumours, or morbid enlargements of the pancreas, pressing upon, or even obliterating, the ducts, particularly the common duct. Several instances of this kind have occurred to me in practice. That biliary concretions, in the common, the cystic, or the hepatic ducts, often produce similar effects, is a sufficiently established fact in pathology.

13. ii. The *symptoms* of accumulations of bile in

the gall-bladder and ducts from impaired action are — fulness and uneasiness in the epigastrium, extending to the right hypochondrium, sometimes attended by a sense of weight, distension, and of coldness in the pit of the stomach, and by pain or uneasiness about the lower angle of the shoulder blades; flatulency, oppression, or acidity of the stomach; a pale or sallow complexion; a dark circle around the eyes; a loaded, pale, or yellowish tongue; diminished clearness of the skin; a soft, slow, weak, or languid pulse; lassitude or debility; inability of exertion; constipation, colicky pains, or an irregular state of the bowels with deficiency of bile in the stools; loaded or dark urine, with a more or less copious sediment; occasionally pain in the eyes and forehead; and mental depression, with disinclination to mental or physical employment.

14. iii. *Complications.* — This complaint may be symptomatic of other affections, particularly of those already alluded to. It may also occasion various associated ailments. When arising from previous disorder of the stomach or of the intestines, or of the liver itself, the primary affection will be more or less increased by it. The associated ailments, with some of which it often stands in the relation either of cause, or of effect, are chiefly, indigestion, constipation, diarrhœa, jaundice, colic, hypochondriasis, agues, rheumatism, gout, herpetic and other cutaneous affections, enlargements of the spleen, asthmatic seizures, dropsy, and palpitations or other irregular actions of the heart. I have often had occasion to observe, that, when any of these complaints was attended by the symptoms characterising this affection, if a purgative succeeded in procuring copious bilious evacuations, a very beneficial effect speedily followed. In many of these morbid associations, a very gentle aperient has produced a very violent operation, but the result has always been most salutary. A lady was subject for some time to palpitations, intermissions of the pulse, with great uneasiness at the præcordia. Various opinions were given as to the nature of the disease. Having been consulted, I observed several of the symptoms indicating accumulations of bile on the biliary passages. A moderate dose of calomel to be taken at bed-time, and a mild purgative draught in the morning, were prescribed. Violent catharsis followed; and the disordered action of the heart disappeared. In 1822, I was requested by a practitioner to see a patient with him, labouring under a severe attack of asthma. He had been purged, but without relief. I inferred from the symptoms, that accumulations in the biliary passages had favoured the accession of the seizure; and therefore prescribed, in addition to other means, five grains of calomel, with one of ipecacuanha, and five of the extract of henbane, to be given at night, and a stomachic aperient in the morning. The former of these procured an irruption of acrid bile into the duodenum to such an amount as to occasion violent cholera; the morbid bile, in passing through the rectum, occasioning severe scalding and excoriation around the anus. — A military officer, who had suffered several attacks of ague, was seized with it in London, during an easterly wind in March. The practitioner who attended him had prescribed purgatives, and the sulphate of quinine, without benefit. I recommended a bolus to be given at bed-time, containing twenty grains of calomel, five of James's powder, and three of camphor, in conserve of roses; a purgative draught in the morning, and persistence in the use of quinine. Before the purgative draught was taken, violent bilious purging came on, and he had no return of the ague. I could adduce, if it were requisite, numerous instances illustrative of the importance of attending to the association of the morbid state now under consideration, with other ailments. I know of no disordered condition which so generally *predisposes*, or so frequently *gives occasion*, to other and more severe diseases, as this.

15. iv. The *Remote Causes* of accumulations of bile are numerous, and not fully recognised by writers. From my own observations in this climate, as well as in warm and other countries, I believe that they will be found to be the following. — (*a*) *Predisposing.* — A warm, moist, low, and miasmatous climate; mental depression, anxiety, and grief; general debility, and weakness of the digestive organs; the bilious, melancholic, or phlegmatic temperaments; sedentary occupations, indolence, and confinement; insolation; too full living, and the use of too much animal food; indulgence in wine or spirituous liquors; and venereal excesses. — (*b*) The *exciting causes* are — the sudden or protracted abstraction of the heat of the body, especially when in an inactive state, as sleeping with too few clothes, or in a damp bed, and the ingestion of cold drinks or ices; neglect of the bowels; and agues, or previous disorder of the biliary apparatus.

16. v. *Treatment.* — The means to be employed for the removal of this disorder are so evident as scarcely to require remark. Cases, however, occur, in which some discrimination, as to the choice of medicines for the evacuation of the accumulated secretion, is necessary. In general, the milder purgatives should be first prescribed; and, if these fail, the more energetic may be employed. It often happens, particularly when the bile has become inspissated, or when the gall-bladder and ducts have had their contractility much impaired by over-distension, or by any other cause, that the repeated exhibition of chologogue purgatives is necessary. But in other cases, especially when the bile has acquired acrid qualities, the gentler means will be the least likely to produce the severe effects often following the first dose of a purgative, after the disuse of this kind of medicine for some time. Accordingly, five grains of blue pill, or of Plummer's pill, may be given at bed-time, and a mild aperient draught the following morning. The evacuations should be inspected, and the repetition of these, or the selection of more active means, determined upon from the appearances they will present. If it should be necesary to repeat the purgative frequently, the mercurial ought to be given with caution, or only on each second or third night, and either of Formulæ 205. 266., or of the following, should be taken on the following morning, and on the intervening nights, until all biliary collections have been removed: —

No. 230. ℞ Infus. Sennæ Comp., Infus. Gentianæ Comp., āā ʒvj.; Potassæ Sulphatis ℈j—ʒss.; Extracti Taraxaci ʒss—℈ij.; Tinct. Cardamom. Comp. ʒjss. M. Fiat Haustus, horâ somni vel primo mane sumendus.

No. 231. ℞ Infus. Calumbæ, Infus. Sennæ Comp., āā ʒvjss.; Sodæ Sub-carbon. gr. xv.—℈j.; Extr. Taraxaci ℈ij.; Tinct. Cardamom. Comp. ʒjss. M. Fiat Haustus ut suprà sumendus.

No. 232. ℞ Potassæ Supertart. in pulv. ℥ss.—ʒvj.; Confect. Sennæ ℥ss.; Syrup. Zingiberis q. s. ut fiat Electuarium molle, cujus dimidium sumatur horâ somni, vel mane nocteque.

17. The above are generally sufficient to accomplish the ends in view. But sometimes they fail, although repeated, to procure a sufficient evacuation of bile, or to remove all the symptoms depending upon collections in the biliary passages. When this is the case, a full dose of calomel, with James's powder or camphor, or ipecacuanha, or with the compound camboge pill, or the compound extract of colocynth, may be given at night; and either of these draughts, or a solution of neutral salts, in the morning. An emetic is often beneficial in such circumstances, before these measures are resorted to. When there appears reason to believe that the accumulation of bile arises from active congestion of the duodenum, particularly when the symptoms of inflammatory indigestion are present, or when the indications of spasm in the ducts seem to exist, calomel is generally necessary, and it may be repeated with advantage. The combination, also, of ipecacuanha or antimony, with the purgative taken at night, promotes the action on the biliary organs. In some obstinate cases, when it was necessary to repeat the purgatives frequently, I have given colchicum, in either of the above draughts, with benefit. Besides these, frictions with stimulating liniments over the right hypochondrium and epigastrium, or a blister, the nitro-muriatic acid lotion, or the emplastrum ammoniaci cum hydrargyro, in the same situation, may be prescribed. A healthy air, or change of air, regular exercise, particularly horse-exercise, early hours, and the use of the Cheltenham mineral waters, or the artificial mineral waters of Seidschutz or of Pullna, with attention to diet, will materially promote the action of the biliary apparatus.—The treatment is in other respects similar to that advised in the articles on Constipation and Indigestion.

III. Excessive Distension of the Gall-bladder.

18. i. It is not often that the accumulation of bile in the gall-bladder is so great as to give rise to an external tumour, as its discharge into the duodenum generally occurs before it reaches this extent. But cases sometimes are seen in which a very distinct tumour is formed by the distended gall-bladder, in one of the following situations: — 1st, In the epigastric region and a little towards the right side; — 2dly, Immediately below the cartilaginous margins of the right ribs; — 3dly, Lower in the hypochondrium, and directed either downwards, or upwards, or even backwards, but most frequently rising into the epigastrium;—and, 4thly, Descending down either towards the umbilicus, or to the crest of the ilium, or between these situations.—The distension of this viscus *arises* — (*a*) from inflammation and tumefaction, or thickening, &c. of the coats of the common duct, occasioning more or less narrowing or complete obstruction of its canal; — (*b*) from similar lesions, or tumours, in the duodenum, implicating the termination of this duct; — (*c*) from the arrest of a biliary calculus in the same situation; — (*d*) from tumours in the pancreas, pylorus, or adjoining parts, or even in the liver itself, pressing upon this duct; — (*e*) From the entire obliteration of the duct, in consequence of either of the foregoing lesions;—and (*f*) possibly from spasmodic constriction, or from the accumulation of thickened bile or mucus in the canal. Of these five alterations, all but the last have been observed by me in *post mortem* examinations. The last very probably has existed in some of the cases in which the tumours have disappeared with more or less rapidity.

19. The tumour, thus formed by an excessively distended gall-bladder, may — α. continue during the remaining life of the patient; β. or disappear after a longer or shorter time, its subsidence being either slow or rapid. This latter event may proceed either from the removal of the obstruction in the common duct, whether this have been spasm, inflammation, or any of the more mechanical obstacles just mentioned; or from the gradual absorption of more or less of the bile in the bladder. When absorption of the contents of this viscus proceeds, an additional quantity not passing into it, the tumour will disappear slowly and gradually. Instances have occurred, however, in which the coats of the gall-bladder, owing to the great distension, or to the acrimony of the contained fluid, have become inflamed, or ulcerated, and have subsequently been perforated or ruptured, the contents being effused, either into the peritoneal cavity, giving rise to intense and rapidly fatal peritonitis, or into some other viscus with which the gall-bladder had previously formed adhesions. Cases of this kind have been recorded by Schenck, Bertin, Alberti, Salmuth, Bonet, Desjardies, Portal, Frank, Double, and Porral. The accumulated bile may even be poured out externally, owing to the adhesion of the gall-bladder to the abdominal parietes, and to the inflammation, ulceration, and perforation having proceeded from the former to the surface of the latter. Horstius, Bloch, Amyand, and De Haen have detailed cases of this description.

20. Although calculi lodged in the common duct most frequently occasion distension of the gall-bladder, yet this cause may exist without this effect being observed; or it may have been present and have gradually subsided. M. Duplay (*Journ. Hebdomad.* t. iii. p. 14.) has adduced a case, in which this duct was completely obstructed by a calculus, the hepatic ducts and their radicles having been much dilated, and yet the gall-bladder was atrophied, and reduced to a simple canal with thickened parietes. Inflammation of the gall-bladder had most probably supervened in this instance, and been followed by thickening and constriction of its coats, with absorption of its contents. M. Petit thinks that inflammatory engorgement and tumefaction of the liver is often concerned in producing accumulation of bile in the bladder; and that, when the resolution of the inflammation is followed by a copious secretion of this fluid, before the congestion or tumefaction and obstruction of the common duct have been removed, the distension of the gall-bladder will often be excessive. From whatever cause it may arise, the accumulation is often remarkable. In a case related by Mr. Gibson (*Edin. Med. Essays*, vol. ii. p. 352.), the tumour was so large as to reach over to the left hypochondrium, to force out the false ribs of both sides, and to occasion great difficulty of breathing. The common duct was found after death obstructed by concretions, and the gall-bladder contained eight pounds of thick bile.—Young (*Philos. Trans.* vol. xxvii.)

found, in the body of a middle-aged female, a similar obstruction, and nearly the same quantity of thick bile in the gall-bladder. Parallel instances, to which references are made at the end of this article, are recorded by VESALIUS, GOLDWIZ, HEUSINGER, HAUTESIERK, AMYAND, VETTER, KRAEFF, VAN SWIETEN, DUVERNEY, PEZOLD, WIEDEMANN, and others.

21. The *contents* of a distended gall-bladder do not always consist of bile. In rare instances, purulent matter, or numerous biliary concretions, have been collected in it. — The former has generally passed into it from an abscess in the liver, either along the ducts, or subsequent to adhesions formed between the external surfaces of the liver and gall-bladder. — MORGAGNI and FANTONI found it distended by air.

22. ii. *Diagnosis.* — A tumour arising from accumulations of bile in the gall-bladder may be mistaken for an *abscess of the liver*, or for *encysted dropsy*, or for a *tumour containing hydatids*; and, if an opening were made into it, in the supposition of it being either of these, a fatal result would immediately ensue, unless adhesions had previously formed between the gall-bladder and the parietes of the abdomen, which rarely take place. It, therefore, is very necessary to distinguish between these diseases and an excessive distension of the gall-bladder. — (*a*) The diagnosis between this latter and *abscess of the liver*, pointing externally, is often difficult. In a case which I had an opportunity of seeing, the surgeon was about to puncture the tumour; when delay having been suggested, and chologogue purgatives prescribed, the tumour disappeared after a copious discharge of bile. A similar case was lately reported in one of the London Medical Journals. M. PETIT, having been consulted in a case that had been considered abscess of the liver, had commenced with the operation for the removal of its contents; but as soon as he had divided the integuments the tumour became soft, and instantly afterwards subsided. He closed the incision and proceeded no further, telling the assistants that this occurrence had shown him the nature of the disease, and that copious bilious evacuations would soon take place. This directly occurred, and the patient recovered. — The symptoms distinguishing between these two lesions are the following: — 1. The rapid appearance and circumscribed form of the tumour, with manifest fluctuation throughout its extent, when it proceeds from the gall-bladder. — 2. The softness and mobility of the integuments over the more prominent parts of the tumour; and the absence of a diffused swelling or hardness at the circumference, and of œdema, or of an emphysematous feel, when it is thus produced. — 3. Abscess of the liver is consequent upon inflammatory symptoms referrible to this viscus. The tumour it occasions forms slowly; is attended with great swelling, and tension in the parts adjoining; and is at first diffused, hard, and imperfectly defined. Fluctuation is very obscure, occurs late in the progress of the swelling, and is confined to the centre, the circumference being hard and tumid. — 4. There are always febrile symptoms attendant upon this disease; but they are seldom observed in distension of the gall-bladder, unless inflammation has supervened. — 5. Pain in suppuration is pulsatory, in the other it is not; and it generally intermits. — 6. Shivering is more frequently present in suppuration, or continues longer, than in distension of the gall-bladder; and it terminates in perspiration, which rarely occurs in the latter. — 7. A distended gall-bladder presents more of the appearance of a deep-seated encysted tumour than of abscess. — (*b*) The swelling from *encysted dropsy* is larger, and the fluctuation more distinct, than from a distended gall-bladder. — (*c*) The same remark, however, does not apply to the *encysted tumours* that contain hydatids. Between both these and distension of the gall-bladder, the diagnosis is often very difficult, unless the appearances of the evacuations, and of the skin, are closely observed. In the latter, the stools are devoid of bile — are white or clayey, &c.; the urine is very dark, loaded, and clouded; and the skin discoloured or jaundiced. In the former, the stools are rarely without bile, and the other symptoms are seldom observed; as there is no interruption of the passage of this secretion into the duodenum, nor suppression of the function.

23. iii. The *Treatment* of excessive distension of the gall-bladder should not be materially different from that advised for the common occurrence of impaired action of the biliary passages (§ 16.). The alkaline subcarbonates, the spirits of nitric ether, and the extract of taraxacum, in liberal doses, either in camphor julap, or in the medicines prescribed above (§ 16.), or in the decoction of taraxacum, will often be serviceable; especially when the use of them is steadily persisted in, is varied according to circumstances, and is aided by the external remedies already mentioned (§ 17.). When the distension seems to arise from the arrest of biliary concretions in the common duct, or, indeed, from any other cause, the liquor potassæ, Castile soap, the subborate of soda, antimonials in small doses, anodynes, the warm bath, and oleaginous aperients, as olive oil, &c. will be the most useful. — *Emetics* are dangerous; but laxatives, mild purgatives, and aperient enemata are beneficial, and should be continued from time to time. In all cases of biliary obstruction, the means enumerated at another place (see art. CONCRETIONS. — *Biliary*, § 14. *et seq.*) will be also very appropriate. — The most suitable *beverages* are the common imperial drink, or a solution of equal parts of the supertartrate of potash and sub-borate of soda, dissolved in a weak decoction of marsh-mallows, or of taraxacum, with a little orange-peel, &c.; or warm whey, or soda water, or spruce beer. The factitious waters of Seidschutz, or of Geilnau, or of Marienbad, or the mineral waters of Seidlitz, of Leamington, or of Scarborough, are often of service both in this and other forms of biliary obstruction. But I believe that there is no mineral water more beneficial than that most common of all mineral waters, namely, sea water, when it is taken in sufficient quantity, and persisted in for a reasonable period.

IV. INFLAMMATION OF THE GALL BLADDER AND DUCTS. *Hepatitis Cystica*, Sauvages; *Cholecystitis*, Hildenbrand.

CLASSIF. — II. CLASS, III. ORDER (*Author*).

24. DEFIN. — *Deep-seated acute pain in the epigastric region, extending to the right hypochondrium, and backwards, generally with vomiting of a greenish bile, frequently with jaundice, and always with symptomatic fever.*

25. i. The *Symptoms* of inflammation of the gall bladder or ducts are extremely fallacious. This disease may be either acute, sub-acute, or chronic; and, in either of these states, it is generally consecutive of inflammation of the concave surface of the liver, or of obstructions of the ducts, or of the irritation of biliary concretions; and hence its approach is slow and insidious, or the symptoms attending it are merely an aggravation of those produced by the antecedent disorder. This is especially the case when it occurs in a chronic or sub-acute form. Chills or rigors may or may not not occur; but they are generally preceded by pain, more or less severe and acute, in the situation mentioned above. Vomiting is frequently present, and the matters ejected are often greenish. There is great tenderness at the epigastrium; and pressure is apt to excite vomiting. Severe colicky pains are felt in the upper regions of the abdomen; and jaundice sometimes appears suddenly. The attendant fever is characterised by a small or constricted pulse; by evening exacerbations; by a very dark, turbid, and scanty urine, and by thirst. The stools are generally devoid of bile. These are the most constant symptoms of inflammation of this viscus; but they are not altogether to be depended upon; for they are usually present in hepatitis, and even in duodenitis or gastritis. — Another circumstance, which adds to the difficulty of diagnosis, besides its mode of accession, is its frequent *complication* with these diseases, or with dropsical effusion, especially in the abdominal cavity. But inflammation of the gall bladder or ducts is often consequent upon excessive distension; and, when this is the case, the characteristic symptoms commonly follow a more or less distinct tumour in some one of the situations I have noticed above; and the nature of the complaint is thereby made manifest; jaundice and white stools, with very dark urine, being then seldom or never wanting.

26. ii. *Changes consecutive of Inflammation of the Gall-bladder, &c.* — These are various. I shall take a brief view of the most common. — (*a*) *Suppuration*, *ulceration*, and *softening*, are not infrequent. The gall-bladder may be almost filled with *pus* from inflammation of its internal surface; but the admixture of pus with the bile, and ulceration, are more common. Cases of this kind have been noticed by VETTER, MORGAGNI, AMYAND, WALTER, MORAND, FRANK, BAILLIE, SOEMMERRING, MARTIN SOLON, and ANDRAL. The ulceration may pass into *perforation*, or even *rupture*, without any very considerable distension of the viscus having previously occurred; the bile being effused in the peritoneal cavity, or into some adjoining viscus, in the manner already noticed (§ 19.). In cases of ulceration and rupture, *softening* is not often absent; and probably it favours the latter occurrence. — (*b*) *Gangrene* is a very rare occurrence. I have seen it mentioned only by J. P. FRANK. — (*c*) When inflammation either commences in, or extends to, the more external coats of the gall-bladder, *adhesions* of it take place to adjoining parts. It has been seen adhering to the peritoneum, by BLOCH, PETIT, &c. — to the omentum, by WALTER — to the duodenum, by LUDWIG, FRANK, PORRAL, REYNAUD, myself, and others — to the colon, by WALTER, &c. — and to the liver, by ANNESLEY, myself, and several writers. These adhesions may exist either with or without distension, or the presence of biliary concretions; but either, or both, are often observed, or have manifestly existed at one period or other of the disease. — (*d*) *Thickening* of the coats of the viscus is evidently a consequence of inflammation in some one of its grades. It has been remarked by SCHMALZ, WALTER, J. P. FRANK, SOEMMERRING, ANDRAL, and myself. STOLL and LEVEILLIE have noticed the thickening, conjoined with a *cartilaginous induration*. — (*e*) *Ossific deposits* in its coats have been found by RHODIUS, WALTER, MURRAY, GRANDCHAMP, MOLLINELLI, BAILLIE, and ANDRAL.

27. There are *various other alterations* of the gall-bladder which do not necessarily arise from any grade or mode of inflammation, and which may be noticed at this place. — α. The gall-bladder may be *hypertrophied* in respect both of its capacity and the thickness of its coats. The simple distension arising from obstruction of the common duct cannot be justly called hypertrophy, although some French pathologists have thus denominated it. — β. *Atrophy*, or wasting, of it is not uncommon, even as a consequence of chronic inflammation affecting either itself or the ducts, particularly the cystic duct. Instances of this change are recorded by MORGAGNI, WALTER, ROSSI, SOEMMERRING, HUFELAND and ANDRAL. In these cases, the passage of bile into or from it having been prevented, the portion of this fluid contained by it has been absorbed, and the functions of the viscus having ceased, its structure has gradually wasted, until it has almost disappeared. — γ. Instances, in which the gall-bladder has been either congenitally *wanting*, or has *disappeared* from antecedent disease, have been adduced by FERNELIUS, MARCELLUS DONATUS, SCHENCK, HUBER, MORGAGNI, JAEGER, LUDWIG, SANDIFORT, ZEIGLER, BALDINGER, LEMERY, BOULET, TARGIONI, TOZZETTI, LITTRE, WIEDEMANN, OTTO, DENDY, &c. — That this viscus may entirely disappear, in the same manner as it becomes atrophied, may be admitted. When only atrophy has occured, there is still some little cavity left; but when the bladder has disappeared, the cystic duct is reduced to a fibrous chord terminating in a mass of cellular tissue. — ε. The coats of the gall-bladder may, moreover, be infiltrated with serum, or contain *tuberculous*, or *calcareous matters*.

28. iii. The *Ducts* — the *hepatic*, *cystic*, and *common* — are liable to all the changes noticed with reference to the gall-bladder — to distension, obstruction, inflammation, thickening, ulceration, softening, perforation, rupture, hypertrophy, atrophy, obliteration, &c. — The *symptoms* however, attending these lesions during life are very equivocal. The symptoms, proceeding from inflammation closely resemble those enumerated as indicating inflammation of the gall-bladder. Most of the changes, to which the ducts are obnoxious, are the effects either of concretions obstructing and irritating them, or of inflammation having extended to, or been excited in, them. Inflammation, whether it extends to them from the duodenum, or from any other part, or arises from the acrimony of the secretion passing along them, is equally accompanied by swelling of their coats, and by more or less complete obstruction of their canals, often with softening or ulceration. — *Constriction* or *narrowing* from this cause has

been observed by Bonet, Hoffmann, Mead, Bianchi, Brüning, Crichton, Baillie, Andral, &c.; and complete *obliteration* of one or other of them has been remarked by myself and most of the writers referred to in this article.—*Ossification* of them has been seen by Bonet and Soemmering. — *Dilatation*, principally of the common and hepatic ducts, is recorded by Schenck, Duverney, Morgagni, Walter, Richter, Duplay, Andral, and Todd. — *Rupture* of these ducts has occurred to Wolff, Andral, and others. References to all the foregoing lesions will be found at the end of the article.

29. iv. *Spasm of the Bile-ducts.*—The existence of this disorder has been presumed rather than proved. Without denying, however, its occurrence, particularly when acrid bile, or gall-stones, are passing along the ducts, I believe that it seldom takes place unless from these causes, and in connection with inflammatory irritation.—The instances of sudden appearance of jaundice sometimes met with have been imputed to spasm of the ducts; but, although spasm may occur independently either of inflammation, or of biliary concretions, yet the pathological state producing jaundice is most frequently seated in the liver itself. The affection, therefore, which has been generally ascribed to spasm of these canals should be rather imputed to either of the above causes, or to any two of them — 1st, to inflammatory irritation without calculi; 2dly, to the irritation produced by calculi; 3dly, to irritation caused by acrid bile; 4thly, to spasm chiefly; and 5thly, to either of the foregoing in connection with spasm. — It is hence most difficult to distinguish spasm from inflammation of the ducts, or either of these from the passage of gall-stones. Indeed, the symptoms indicating the latter are in no respect different from those attending upon most of the cases generally imputed to spasm. — A sudden, sharp, deep-seated, and severe pain at the pit of the stomach, darting back to the right side of the spine, or to the lower angle of the right shoulder-blade, and to the hypochondrium, occurring in paroxysms, and often followed by rigors, coldness of the extremities, &c., are felt in both. Nausea and vomiting are sometimes also present. When, however, the disorder proceeds chiefly from spasm, pressure gives relief of the pain in the epigastrium, as well as of the colicky pains usually felt at intervals in the abdomen.—The patient commonly turns upon his belly, or lies partly on the right side, and partly on the abdomen. This, in connection with the slight affection of the pulse, chiefly distinguishes spasm, from inflammation, of the ducts. In other respects the symptoms are nearly the same as those stated to indicate the passage of the gall-stones. — (See art. Concretions — *Biliary*, § 8.)

30. v. Treatment. — *Inflammation of the gall-bladder and ducts* should be treated in a nearly similar manner to other inflammations, but with reference to the organisation and functions of the part. The *first intention* should be, to remove the inflammation; the *second*, to procure a free and healthy flow of bile into the duodenum. *Bloodletting*, both general and local, is always requisite; and generally tends to the fulfilment of both indications. Immediately after the first bloodletting, a full dose of *calomel* — from five to twenty grains — according to the age and strength of the patient, with *James's powder* and *opium* or *hyoscyamus*, may be given, with few exceptions. Experience has proved the propriety of exhibiting one or two doses of this medicine, in cases where these parts have been either partially or chiefly implicated, and the experiments of Mr. Annesley have demonstrated the influence of a large dose of calomel in diminishing inflammatory irritation of the stomach and duodenum,—an effect which, if produced in these viscera, will probably extend to the gall-ducts. If a repetition of the bleeding should be necessary, the calomel, antimony, and opium may be repeated immediately afterwards, as this combination has a most decided effect, when thus exhibited, in diminishing vascular action, and in equalising the circulation. Mild *aperients* and *cathartic enemata* may subsequently be given; and, having thereby procured evacuations, medicine of a *deobstruent* and *relaxant kind* should be prescribed. The *alkaline subcarbonates* with *taraxacum;* the *subborate of soda*, in the *decoctum althææ*, with small doses of *ipecacuanha*, and of the powder or the extract of the leaves of *belladonna*, and the *nitrate of potash* or *muriate of ammonia*, in camphor mixture, with large doses of the *spirits of nitric ether;* are the most appropriate medicines; but they should be given in repeated doses, and so as not to offend the stomach.

31. Of the *external applications*, the most efficacious are the warm *terebinthinated embrocation*, *warm poultices*, *fomentations*, and afterwards a plaster, consisting either of the *emplastrum ammoniaci cum hydrargyro*, or chiefly of the extract of *belladonna* and *camphor*, according to the peculiarities of the case. — Having removed inflammation, and relieved the more urgent symptoms, by these or similar means, a due flow of bile into the duodenum should be promoted by small doses of blue pill, or of Plummer's pill, the liquor potassæ, or the subcarbonates of soda or potash, or the subborate of soda, or the acetate of potash, or the extracts or decoction of taraxacum or of chelidonium, or the ethers, &c. variously combined. A gentle action on the bowels, by emollient and oleaginous medicines, should be continued for some time. If pain of a spasmodic kind recur, belladonna, or hyoscyamus, or opium, or colchicum, may be given with these; and if the irritation seem to be owing to the presence of gall-stones, the combination of the spirits of turpentine, with sulphuric ether as advised by Durande, Straub, Witting, Quarin, and others, or with alcohol, as recommended by Percival, or with the spirits of nitric æther as directed by Wolf, may be tried. An anodyne may also be given with either of these combinations, especially hyoscyamus, or belladonna. — *Colchicum*, with the alkaline subcarbonates, has proved of great benefit in some cases in which I believed the biliary passages to have been implicated in the inflammation of the associated viscera; and *prussic acid*, given in full doses with olive oil, or with almond oil and camphor julap, has afforded great relief where there was every reason to suppose that gall-stones or spasm was the cause of suffering.—The treatment in other respects, as well as the diet and regimen of the patient, are altogether the same as are fully detailed in the articles Concretions — *Biliary*, and Jaundice.

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GANGRENE. — Syn. *Gangræna* ; *Sphacelus* ; *Mortification.* — Γάγγραινα (from γράω, I eat or devour). *Gangrène* ; Fr. *Der Brand*, Germ. *Cangrena*, Ital. :

Classif. — IV. Class, IV. Order (*Author*, in *Preface*).

1. Defin. — *Death of a part or the whole of an organ.*

2. The terms *gangrene*, *sphacelus*, and *mortification* are usually applied to the same condition, especially by Continental writers. Dr. Carswell has pointed out certain distinctions between them, restricting the first appellation to incipient mortification, and the second to the last stage of this lesion. He has thus made Mortification to be the generic term. This is in accordance with the meaning usually attached to the terms in this country ; but, as mortification is the last result of the morbid state — is no longer a disease, but its termination — I have preferred the first of these appellations ; and especially as it is the most appropriate to the changes generally comprised under these terms, and as it is usually applied to a lesion which, in respect of its nature and treatment, comes much more within the province of the medical practitioner, than that which the terms sphacelus and mortification are generally employed to represent. — Formerly, gangrene, particularly in its medical relations, was considered merely as a consequence of inflammation ; but a more extended view of it has been taken by some Continental writers : and, still more recently, it has been treated by Dr. Carswell in an able and comprehensive manner. The *division* of this subject must necessarily have an intimate relation to the principal causes which produce it. In considering, therefore, the *pathological relations of gangrene*, I shall view it successively — 1st, As a consequence of inflammation ; 2dly, As a result of local or general debility or exhaustion interesting chiefly the organic nervous influence ; 3dly, As an effect of obstructed circulation ; 4thly, As produced by various physical agents ; and 5thly, As occasioned by poisonous substances.

3. I. — Pathological Relations of Gangrene. — i. Gangrene Consequent upon Inflammation. — All parts susceptible of inflammation may become gangrenous in consequence of it ; but there are various circumstances that cause this change to be more common in some tissues or parts, than in others. The *vascularity* of a part disposes it to inflammation, and consequently to gangrene. Hence, cellular and mucous tissues are much more liable to it, than fibrous and serous structures. The latter never experiences it until the cellular tissues by which they are nourished have undergone a similar change. — The *sensibility, excitability*, and *susceptibility* of a part have also a great influence in producing it ; the disposition to inflammation, and to gangrene as one of its results, being in proportion to the grades of these properties with which an

organ or structure is endowed.— The *situation of a part or structure* at a distance from the centre of vital or nervous influence, and of circulation, has also some influence in favouring the termination of inflammation in gangrene. Also, intense grades of inflammation in these parts may proceed until this result takes place, without causing death; whereas inflammations of the more vital and central organs, as the heart, brain, &c., put an end to life before this change has supervened.

4. *Various pathological states* dispose not only to inflammation, but also to the supervention of gangrene. The most important of these are— *a.* Disorder of the digestive organs, especially impaired energy of the organs most directly influenced by the organic nervous system;— *b.* A weak and irritable state of constitution;— *c.* Exhaustion by previous disease, particularly by fevers and epidemic maladies;— *d.* Interruptions of the excreting functions, and of the depurative action resulting therefrom;— Morbid conditions of the blood, as in typhoid, malignant, and exanthematous fevers, in erysipelas, and in scurvy;— *f.* Pre-existent functional or structural changes in a part, as impeded circulation, congestion, &c.;— *g*, Interrupted circulation in an adjoining organ, or obstructed return of the venous blood from the part affected. These conditions not merely predispose to inflammation, but also modify its characters, and favour most remarkably the occurrence of gangrene, especially when more than one of them are in operation; as in erysipelas, in which we generally observe the inflammatory action supervene on marked disorder of the digestive and excreting functions, on a morbid state of the circulating fluids, and on disordered circulation in the part.

5. The *Causes* which induce inflammation also influence its termination in gangrene, but to a much less extent than the influences already noticed, unless they be of a disorganising or poisonous kind, when they more properly fall under a different head. *Intensity of the exciting causes*, relatively to the excitability and susceptibility of the part, have some influence, especially when it is great; the consequent vascular reaction, in connection with the morbid impression made by the cause upon the vital properties of the part, often rendering inflammation more acute and severe, and thereby more prone to exhaust vital power, or to pass into gangrenous disorganisation. But agents which excite inflammation, without producing a mechanical, chemical, or poisonous operation, do not very remarkably favour the occurrence of gangrene, independently of this circumstance, and of those already enumerated. The disposition to terminate in gangrene will doubtless be increased by the *intensity of the local and general vascular action* relatively to the state of constitutional power; but such intensity of action will itself, in a great measure, result from the circumstances already enumerated. In a word, therefore, the causes of inflammation passing into gangrene, are those stated above, in connection, with peculiarity of temperament, constitution and habit of body, and with the intensity of local and general vascular action, relatively to vital resistance or power, characterising the inflammatory state.

6. *A. Of the Phenomena of Gangrene from Inflammation.—a. In respect of particular Tissues and Organs.— α. Of the integuments.—* When inflammation is about to pass into gangrene, very evident changes take place in the *colour*, *temperature*, *sensibility*, and vital *cohesion* of the part. The redness becomes darker, or changes to a livid, violet, purplish, or black hue. The morbidly increased temperature and the augmented sensibility of the inflamed part are remarkably lessened; and the pain has disappeared from it, and extended to the surrounding structures. The vital cohesion of the part is much weakened, although its density is sometimes augmented.— Vesicles also appear on the surface, owing to the effusion of serum, or of a sanguinolent serum, under the cuticle. —These changes become more manifest as the gangrene passes into its second stage, or sphacelus. The colour becomes grey, yellowish grey, greenish, brown, or black, or various intermediate shades. The vesicles are now enlarged, or the cuticle is entirely separated by the effusion of a bloody serum beneath it, which escapes and leaves the skin loosely covered by it, or partially denuded and discoloured. The integument crepitates on pressure, is puffy, soft, cold, and insensible. It soon afterwards emits a cadaverous and offensive odour, indicating that the gangrened part is quite dead, and is undergoing decomposition.

7. The emphysema and fœtor of the part are proofs of the gangrene having arrived at complete mortification and putrefaction; but the part may be completely dead without these phenomena being observed. Among the chief changes that occur after gangrene has taken place, are the *spreading* and *limitation* of it. The former is increased by whatever depresses the organic nervous power or contaminates the blood; and, as long as it continues, the dark red or livid discolouration attending it extends further and further, and gradually disappears in the surrounding sound skin. The latter change is promoted by whatever restores nervous energy, increases vital resistance, and promotes the assimilating and excreting functions. As soon as it commences, the livid or dark red discolouration of the circumference or margin of the gangrened part is more narrowed. Ulceration commences at the margin of the inflamed part, and separates from it, in the form of slough, the portion which had become gangrenous. The loss which is thus occasioned, is partially repaired by the exudation of coagulable lymph, which, becoming organised in the form of granulations, assume more and more of a membranous form, and constitute, in its complete state of reparation, the cicatrix.— A favourable change in the part and in the constitutional affection may occur at an early period of gangrene, and the result may be still more felicitous. In this case, the dark red or livid colour of the affected part becomes more circumscribed, and assumes a brighter tint: the swelling subsides, and the temperature gradually returns; all the functions, as well as the organisation, are preserved.—Gangrene of the skin always implicates to a greater or less extent the subjacent cellular tissue; but this latter may be the primary and chief seat of this change.

8. *β. Gangrene of the cellular tissue.*— This tissue is more frequently, more extensively, and more rapidly affected by gangrene than any other part, more particularly where it is most abundant or is covered by aponeurotic expansions, which prevent contaminating fluids from reaching the

surface.—Gangrene of this tissue is either *diffused* or *circumscribed*. In the *diffused form*, it generally occurs in external parts, and most commonly follows erysipelas, and diffused inflammation of the cellular tissue from abrasions, wounds, punctures, and the inoculation of morbid or putrid matter, as by wounds in dissection. In these cases the inflammation spreads rapidly and extensively, terminates quickly in gangrene, and often extends to the blood-vessels, tendons, aponeuroses, and lymphatics. These resist, for a longer time, the disorganising process; and are often seen, especially in the extremities, running in the midst of decomposed cellular tissue, and of effused fluids. If the inflammation affect the interior of a considerable venous or arterial trunk, particularly that which chiefly supplies a limb, the circulation through it is interrupted by the lymph effused in its canal, and the entire part beyond the seat of obstruction is struck by gangrene. In the internal viscera, gangrene very seldom occurs in a diffused form, unless in cases where erysipelas extends to the fauces and parynx, or in the more malignant cases of angina.

9. *Circumscribed gangrene* of the cellular tissue is seen in that connected with the integuments, in the common boil, and in carbuncle. When gangrene is observed in the cellular tissue of internal organs, it almost always is circumscribed. When the *submucous tissue* is its seat, it generally is in spots or patches of various dimensions, and is consecutive of inflammation which has commenced in the mucous membrane, and extended thence to the submucous tissue. In such cases, particularly in dysentery, considerable portions of the mucous surface are detached, owing to gangrene of its subjacent tissue. —Although gangrene of the *subserous cellular tissue* is more or less circumscribed, yet it is often extensive; but, in these latter instances, the serous membrane is also implicated. This is especially the case when the sub-peritoneal tissue is the seat of lesion. It is rarely, however, that the inflammation of it, which terminates in this manner, commences in the peritoneum, unless in some cases of strangulation from hernia or introsusception. It commonly either originates in the cellular tissue itself, or extends to it from adjoining parts. Indeed, this is always the case in respect of the subperitoneal tissue of the lumbar, iliac, and pelvic regions.

10. *γ. Mucous membranes* are sometimes found gangrenous; but not so frequently as was supposed by the older writers, who mistook softening, discolouration from the imbibition of morbid secretions, and even albuminous exudations thrown out on their surfaces, in the form of false membranes, for sphacelation.—Gangrene of this membrane is generally circumscribed, often very limited, and seated chiefly in the throat, the lower part of the ilium, in the cæcum, the sigmoid flexure of the colon, and in the rectum. The inflammation producing it commences, and is chiefly seated, in the mucous tissue itself, or in the follicles, or in both. The gangrene may be limited to either of these, or may extend to both, and even to the subjacent cellular tissue. Where thus changed, the mucous membrane at first presents an ash grey or greyish yellow colour, which often changes to brown or black; but the gangrened part may be tinged by the secretions or other substances applied to it, especially by the bile, or by the blood.—The part surrounding the slough is generally congested, of a brownish red, or of a purple, or livid hue. Dr. Carswell remarks that, when the inflammation has been confined to the agminated, or Peyer's, follicles, and when the greater part, or the whole, of the follicle has sloughed, little congestion or inflammatory redness may remain. If these glands are already the seat of disease — as in continued and hectic fevers, consumption, &c. — a slight attack of inflammation may destroy their vitality, and little or no vascularity may be observed around them after death. The mucous surface of the *bronchi* is rarely the seat of gangrene, and only consecutively of inflammation of adjoining parts. — Gangrene of the mucous surface of the *uterus* and *vagina* is not infrequently seen in dissections after puerperal fevers. (See Puerperal Diseases, and Uterus.)

11. *δ. Serous membranes* are the seats of gangrene, only consecutively of this, or of some other cause, as suppuration, ulceration, &c. in the subserous tissue, as noticed above (§ 9.). When ulceration of any part of the digestive canal extends to the peritoneal surface, this membrane, having lost the supply of blood from the subjacent tissue, sometimes experiences sloughing at the bottom of the ulcer, and consequent perforation. But this is observed chiefly when the ulcer is large, and the patient's habit of body cachectic; and most frequently in the lower part of the ilium.—The *pleura* is more rarely the seat of gangrene than the peritoneum; and the costal pleura is still more rarely affected than the pulmonary pleura. Gangrene of the latter is met with as a result of the softening of tubercles situated immediately underneath the pleura, or of gangrene of a subjacent portion of the lungs. — The serous membranes of the brain are gangrenous only as a consequence of severe injury; particularly when the membranes are exposed, and when the part is affected by erysipelas or hospital gangrene. This latter cause of gangrene of the cerebral serous membranes has been noticed by Mr. Copland Hutchison. When the serous membrane is sphacelated, it assumes an ash grey or slate colour; but it may be variously tinged by bile, blood, or morbid matters. It is also soft and spongy, and is readily detached from the surrounding tissues, which are usually more or less injected.

12. *ε. Fibrous tissues* become gangrenous only in consequence of this lesion in the immediately adjoining parts. — The *muscular tissue* is very rarely seized by gangrene after inflammation. The muscular tunics of the digestive canal are sometimes, however, thus affected, owing to the extension of gangrene from the associated tissues, as in the case of sloughing ulcers commencing in the internal coats of the tube. If recovery take place after a portion of the muscular tunic has been thus destroyed, the cicatrix which is formed contracts, as Dr. Carswell has stated, and the diameter of the canal is permanently lessened. — The *heart* is, perhaps, never even partially gangrenous whilst life continues; and the *arteries* and *veins* are never the seat of this change until the surrounding cellular tissue, and cellular coats of these vessels, are destroyed by it. Gangrene of the *brain*, of the *lungs*, of the *liver*, of the *spleen*, of the *kidneys*, of the *uterus*, &c. is

noticed in the articles devoted to the pathology of these organs.

13. *b.* The *changes which take place in the capillary circulation*, when the inflamed part is about to pass into gangrene, have been observed by several pathologists, but by none with so much care and precision as by Kaltenbrunner (*Exper. circa Statum Sang. et Ves. in Inflam.* 4to. Mon. 1826, p. 82.) and Gendrin (*Hist. Anat. des Inflam.* t. i. p. 31. *et passim*). According to their researches, and my own observations, the *capillaries* lose their tonicity and vital cohesion, become distended or even ruptured, or allow the exudation of a portion of their contents. At the same time, the *blood* in the distended capillaries ceases to circulate; changes from a dark red, to a dark brown or black hue; and coagulates; its globules uniting, adhering to the internal surface of the vessels, and filling their canals. A similar change takes place in whatever blood may have been effused into the areolæ of the tissues during the acme of the inflammatory state, or the passage of it into gangrene. This alteration of the blood and of the capillaries causes the livid, purple, or black hue of the affected part; and the loss of vital cohesion, and exudation of the serum, occasionally with some of the dark colouring matter of the decomposed blood, produce the soft pulpy state attending the passage of gangrene into sphacelus. With the cessation of circulation, the sensibility is quickly lost; and when the part is deprived of its vitality, incision of it neither excites sensation, nor causes loss of blood. Absorption, also, entirely ceases in the gangrened part; but proceeds with activity at the margins of the living and sphacelated tissues, as shown by the local and constitutional phenomena, and by the separation between the living and dead parts, which is partly occasioned by this process.

14. *B. Terminations, &c.* — The changes that take place in the margin of the living inflamed part are important, as upon these depends the occurrence of one or other of the following phenomena. — 1st. The limitation of the gangrene, and separation of the diseased part; — 2d. The spreading of the gangrene, and the contamination of the circulating fluids; — 3d. Dangerous or fatal hæmorrhage; — and, 4th. Ulceration. — (*a*) The *entire separation of the gangrened part*, in a state of sphacelus, is caused by the production of coagulable lymph in the inflamed parts surrounding the gangrene. This lymph prevents the decomposed fluids from contaminating the surrounding tissues, by agglutinating not only the areolæ of these tissues, but also the orifices or canals of the minute vessels. It also promotes the coagulation of the blood in the larger vessels, and thereby prevents the occurrence of hæmorrhage. It lastly, as the separation is perfected, becomes organised, in the tissues which it agglutinates, or in which it is effused, and is essential to the healing of the part.—(*b*) The *spreading of the gangrene* arises from the local and constitutional vascular action being so weak, or asthenic, or otherwise so morbid, as to be incapable of forming coagulable lymph, whereby the contaminating influence of the decomposed fluids and sphacelated tissues upon the surrounding parts may be resisted, the minute vessels agglutinated, their fluids coagulated, and absorption prevented. When this result is observed, the vital power of the part, or of the constitution, is in fault; and either a cachectic habit of body, or a morbid state of the blood, has preceded the occurrence of gangrene, as in erysipelas, scurvy, fever, &c. — (*c*) *Hæmorrhage* may attend either of the preceding states of sphacelation. In the former, it arises from an imperfect coagulation of the blood in the large vessels, at the margin of the living inflamed part; the lymph not being sufficient to obstruct its extremity, or to coagulate the blood in it with the requisite firmness. In the latter, the hæmorrhage is much more frequent, as these circumstances obtain much more generally, and to a greater extent in it, than in the former. — (*d*) *Ulceration* may follow either internal or external gangrene. In these cases, organisation of the coagulable lymph that is formed, or granulation, does not take place; but absorption of it with the tissue in which it is deposited proceeds gradually. It is owing to this, that perforation of hollow organs follows sphacelus. When the mortified part is retained, owing to its situation, or is not thrown off, it becomes macerated, or reduced to shreds, by the fluids poured out by the surrounding vessels. A partial absorption may occur in these cases, and, by contaminating the circulating fluids, terminate life in a short time, or place it in imminent danger. — In some instances, as introsusceptions, adhesions of the opposed margins of the living inflamed parts may take place, with perfect union, the sphacelated portion being evacuated. A dead part of the lung may also be thrown off by the bronchi.

15. When gangrene, in its earlier stage, is arrested, and terminates in restoration of the healthy state, the blood begins to move in the obstructed capillaries, and the circulation, especially at the circumference, becomes more and more active. The globules of the coagulated blood seem to separate, and to pass into the currents of the minute canals; sensibility gradually returns; and the colour of the part becomes less dark or livid. The temperature also rises; and the absorption of the effused fluid commences. At last, the size and firmness of the part, with all its functions, are restored.

16. ii. Gangrene from Local or General debility — *from Exhaustion of Organic Nervous Power.* — Depression of the organic nervous or vital influence is the chief pathological element or precursor of this form of gangrene, which, owing to this circumstance, is contingent on certain adynamic diseases, as typhoid fevers, scurvy, noma or gangrenous thrush, and other maladies attended by extreme asthenia. This variety is often preceded by increased sensibility, heat, and injection of the part. The last of these characteristics is the most common; and is frequently caused by pressure, as observed in the parts on which patients rest in bed, by friction, puncture, and the irritation of morbid secretions. The application of leeches, blisters, or the tartarised antimonial ointment to debilitated or cachectic children often produces it. But it occasionally appears, and proceeds rapidly, without any very manifest antecedent, or attendant, inflammatory action — certainly without increased action of a sthenic kind — particularly in very unhealthy children, and in persons affected by scurvy, or the low putro-adynamic states of fever. In these,

very slight causes will occasion engorgement of portions of the integuments, or of internal viscera, followed by the changes already described as constituting gangrene and sphacelus; and local congestions will sometimes occur and be followed by loss of vitality, without any obvious cause, or any obstruction to the circulation, or manifest increase of vascular action in the part; whatever action may appear being of an irritable, asthenic, or extremely weak kind. The gangrenous or asthenic form of *furunculi*, and the humid or phagedenic sores met with in the mouth, gums, cheeks, genitals, &c., of unhealthy children, are illustrations of this variety — the chief characteristics of which are, depressed organic nervous or vital power; imperfect or asthenic vascular action, both previous to, and attendant upon, the gangrenous lesion; and a poor or vitiated state of the circulating fluids. (See SCURVY; and THRUSH — *Gangrenous.*)

17. iii. GANGRENE FROM OBSTRUCTED CIRCULATION. — The *arteries* may be incapable of conveying blood to, and the *veins* of returning it from, a part. In the preceding varieties of gangrene, the organic nerves and capillaries are the primary and chief seats of the lesion. In this variety, they are consecutively affected, owing to the obstruction which causes it either cutting off their supply of blood, or preventing the return of it. — The changes which take place in either case are somewhat different, particularly as to the order of their procession. When the blood is sent in insufficient quantity to, or is entirely prevented from arriving at, an organ or part, the effect upon the nervous and vascular organisation of it must be such as to cause its atrophy or death; for the fluid requisite to nutrition and life is no longer supplied to it. But when the return of the blood is obstructed by lesions of venous trunks, or by tumours pressing upon them, or by disease of the heart, an undue accumulation of blood takes place in the capillaries and veins beneath the seat of obstruction; the blood stagnates more or less; the capillaries are distended beyond their powers of reaction, and their tonicity is exhausted; effusion supervenes in the more porous and yielding tissues; the organic nervous and vital power of the part, already impaired by the stagnation of the capillary circulation and the venous properties of the blood, are still further depressed by the progressive effusion and distension; and at last, if the obstruction become complete, the vital manifestations of both nerves and capillaries are entirely extinguished. The varieties which thus proceed from these different pathological states require separate notices.

18. *A. Gangrene from Obstruction of Arteries.*—A *ligature* placed around an arterial trunk, when the circulation is not supplied by collateral or anastomosing branches; the *rupture* of the internal and middle coats of an artery, occasioning obstruction of its canal; *inflammation*, followed by the accumulation of fibrinous lymph in its interior, and obliteration of the vessel; and osseous or fibrinous deposits in its coats or in its cavity; are the circumstances which give rise to this variety. — *a. Gangrene from rupture of the internal coats of an artery* has been described by Professors TURNER and CARSWELL. The rupture of these coats is obviously the result of previous disease. But, however produced, it is manifest that the lacerated part, with the lymph effused from it, will often prove a nucleus around which a fibrinous coagulum will form, and increase until the circulation in the vessel is entirely obstructed. The gangrene will be merely contingent upon this occurrence; for the coagulum may not entirely obstruct the vessel; or the obstruction may be complete, and yet the circulation may be carried on by collateral, or by enlarged anastomosing vessels. — An abstract of one of the cases detailed by Mr. TURNER will illustrate the progress of gangrene from this cause, as it agrees with one which I had an opportunity of seeing, and in which amputation was performed. About half an hour after rupture of the popliteal artery, no pulsation could be felt in any of the arteries of the foot, nor in the ham. The foot was cold. No pain was excited by pressure on any part of the limb; but cramp-like pains were felt in the calf of the leg. The following morning the foot was pale and cold, and the integuments below the ankle were entirely void of sensation, even when pinched or tickled. The muscles of the foot seemed to have lost their power of contraction. The next day, mottled purple patches appeared on the instep and fore-part of the ankle, and gradually extended over the whole foot, till the surface, by the fifth day, was entirely livid. With the progress of discolouration, the foot swelled slightly, became œdematous, and seemed somewhat warmer. On the seventh day, several tense, globular vesications appeared on the foot, some filled with reddish, and others with pellucid serum. They increased in number, and extended to the calf of the leg. About the ninth day, the soft parts above the ankle were livid, the discolouration proceeding upwards to the calf of the leg, and soon afterwards nearly to the knee. The soft parts adjoining the discoloured skin were swollen, and very painful on pressure, but no redness nor any inflammatory line between the gangrened and living parts appeared. The discoloured parts were completely insensible. The patient had been much reduced by his previous illness; but with the progress of the gangrene, weakness, tendency to faint, copious sweatings, quick and feeble pulse, became very prominent symptoms, which were followed by cough, laborious breathing, and death upon attempting to sit up in bed.—The coats of the artery were found, torn, thickened, and the canal filled by fibrine, lymph, and coagulated blood.

19. *b. Inflammation of the internal coats of an artery*, particularly of one or more considerable branches, is followed by effects similar to those just described; especially if the obstruction of their canals, by lymph and coagula, be complete. Gangrene from this cause has been noticed in the article on *Inflammation of* ARTERIES (§ 29.). It may occur in internal viscera, as well as in external parts, although the evidence of its existence in the former is not so complete as may be desired. The gangrene that sometimes attacks a portion of the lungs may probably arise from this cause, but there is no satisfactory proof of such being the case. It does not, however, appear unreasonable to infer that, in some constitutions and habits of body, inflammation may extend from the substance of the lungs to the blood-vessels themselves — arteries or veins — and that the inflamed part may

rapidly pass into gangrene, owing to the obstruction of the circulation in one or other of these vessels. — Of the occurrence of gangrene of a limb from inflammation originating in a large artery, there can be no doubt, as several instances of this kind are on record. In these cases, the consequent obstruction of the main trunk may be sometimes attended by a partial collateral circulation, which, although insufficient to preserve the vitality of the whole limb, yet may preserve that of a considerable part below the place where the vessel is obstructed. A case illustrating this fact is recorded in the *London Medical Repository*, vol. xviii. p. 119.

20. *c. Gangrene from fibrinous or osseous formations in arteries — Senile gangrene — Idiopathic, dry, or spontaneous gangrene.* — When these formations are so extensive as to prevent the circulation through the main arterial trunks of a limb, a different route is often not established; the diseased state of the smaller vessels, especially those in connection with the affected trunks, indisposing them to become the collateral channels of circulation.—When an arterial trunk is thus obliterated or obstructed, the gangrene generally commences with a dark brown, purple, or black spot in one or more of the toes, frequently without any previous swelling, or any increased heat or sensibility. Occasionally, a pricking or tingling sensation is felt in the discoloured toes, which are colder than natural, and often numb. The purple or black discolouration soon gains the whole of one or more toes. There is no increase of their size, but rather a diminution of it; and seldom pain on pressure. In some instances, however, increased temperature, sensibility, and bulk of the affected toes precede the changes just described. The discolouration proceeds gradually to all the toes, and thence over the back and sides of the foot. It sometimes extends as high as the knees; but death generally takes place before it reaches thus far. It is seldom preceded or attended by much swelling of the parts, which the gangrene successively invades; but there are occasionally seen a dark redness of the skin, with heat, pain, and slight puffiness or tumefaction. In many instances, particularly when the accession of the disease has been slow, the parts are even wasted before they are struck by gangrene; and, when this has been the case, they are afterwards shrunk, indurated, and dry. In more sudden and rapid attacks, where the obstruction is less complete than in these, Dr. Carswell justly remarks that considerable congestion is induced, with the effusion of more or less serosity, whereby the bulk of the foot, and, more frequently, of the leg, is augmented; but even in this case, the toes, the primary seat of the disease, are not increased in size. It is in the progress of the disease upwards that congestion or œdema occurs; that the skin becomes tense and painful; and that the febrile symptoms, if they have not yet appeared, supervene, increase rapidly, aggravate the local affection, and hasten death.

21. This form of gangrene seldom occurs before sixty, very rarely before fifty, and never in young persons. The obstructions found on dissection are ossification of the arteries of the affected limb, and often also of other parts of the body; and a fibrous tissue formed either in the coats or in the canals of the vessel. In these latter cases, the artery is sometimes converted into a solid or ligamentous cord. Occasionally ossific spiculæ or deposits project into the canal of an artery, solid fibrine having collected around them (see art. Arteries, § 63.). Instances of gangrene from disease of the arteries are recorded by Saviard, Hébréard, Andry, Chavalier, Begin, Hodgson, Cruveilhier, Avisard, Marjolin, Syme, and others, mentioned in the References of this article. Two cases of the disease from ossification together with obliteration of arteries have occurred in my own practice. It has been supposed, that ossification of the principal arteries of a limb, will of itself produce gangrene; but it will not have this effect unless some other cause of obstruction, as narrowing of the canal, fibrinous formations, &c., be conjoined with it. The appearances in my own cases, as well as in those recorded by the other writers referred to, demonstrate this fact. In some of those the obstruction was not limited to the arteries, but was seated also in the veins. In the one examined by M. Brulatour, the arteries above the seat of gangrene were partially ossified, their calibre diminished, and their channels filled by solid fibrinous deposits. The coats of the veins were thickened, and fibrinous coagula adhered to their internal surface. — The lesions of both arteries and veins were evidently the consequences of inflammatory action of a sub-acute or chronic kind.

22. *B. Gangrene from Obstruction of Veins.* — Gangrene may arise from this cause both in external and internal parts; but especially in the latter. — *a.* It rarely occurs in the former, as the veins are so numerous, even in the extremities, as to admit of a collateral circulation, although many of them may be obstructed. I had, however, an opportunity of attending a case with Mr. Davies (*Lond. Med. Repos.* vols. xxiii. p. 451., and xxiv. p. 51.), in which gangrene of the foot and great part of the leg took place, owing to interrupted circulation in the veins of the limb. On dissection, the femoral vein was found inflamed in the highest degree, and its coats thickened. It was full of coagulated blood. This state extended throughout the iliac vein into the cava, nearly as high as the diaphragm. All the small veins of the diseased limb seemed in a similar state.

23. *b.* Internal gangrene is often owing to pressure upon the veins, especially in cases of hernia and introsusception. But, in other instances, this cause is rather inferred than demonstrated. Dr. Carswell thinks that gangrene of portions of internal viscera, from the pressure of indurated tumours, is not uncommon, particularly in the lungs, liver, and intestines; but it seems to me, that the cause is seated as often within the veins, as external to them — that the obstruction frequently consists in obliteration of their canals, either from previous inflammation, or from coagula formed in them. This is evidently the chief cause of many cases of gangrene of a portion of the lungs; both veins and arteries running between, or in the vicinity of, excavations becoming obstructed, owing to the extension of the morbid action to them. But inflammation or obstruction, particularly of the veins, may have been induced by the transit of tubercular matter, or other morbid secretions, into them, which may either inflame their internal membrane, or coagulate the blood in them; the consequent obstruction causing

sphacelating ulcerations and cavities, or extending those which may have already commenced. In phthisis, attended by a very copious offensive expectoration, containing portions of softened cellular substance and tuberculous matter, or by a dirty brown, or greenish, or greyish sputum, with a gangrenous odour, the existence of one or other of these lesions may be inferred. — In cases of adventitious, cancerous, or other malignant formations, either the pressure of the tumour upon the adjoining veins, or the absorption of a portion of the morbid secretion, causing coagulation of the blood or other obstruction in the veins, sometimes gives rise to mortification of portions of the morbid mass, which may fall off in a state of gangrene or sphacelus.

24. In gangrene from intus-susception, the veins of the mesentery are pressed upon just at the points where the external and internal folds of the duplicature forming the invaginated portion of the intestine terminate superiorly. The consequence of this pressure or stricture is congestion of blood in the incarcerated part, and inflammation at the point of pressure or stricture. When the inflammation is attended by the exudation of coagulable lymph, the adhesion of the strangulating and strangulated portions, just at the point of stricture, is the result, and the latter portion is evacuated in a gangrenous or sphacelated state; and either in one, or in successive portions. When the part is only gangrenous, it generally still retains its form, and the coats may be easily traced in it after maceration. The diameter of the intestine frequently experiences no diminution at the point of separation and union; and recovery may be complete, although a very large portion of the bowel may be lost in this manner. (See art. Colic, and Ileus, § 38.)

25. *C. Gangrene from Disease of the Heart.* — It occurs principally in the lower extremities, contingently upon impeded circulation in the veins with effusion of serum into the cellular tissue. Its progress is often slow; but it may be rapid. It is always consequent upon œdema or anasarca of the limbs, scrotum, and labia pudendi. When gangrene is likely to appear, the previously white, tense, and shining skin, becomes mottled with dull red or purplish spots, owing to the congestion of congeries of cutaneous veins. To these succeed bullæ or phlyctenæ, from the effusion of serum under the cuticle. Upon the bursting of these, the skin underneath is dark brown or livid, and is soon converted into an ash grey slough. Increased pain and redness are sometimes present, and either precede or accompany the separation of the dead part. Previously to the injection of the cutis, the temperature of the limb is usually very low; but as this change takes place, and as sloughs form, both the heat and the sensibility of the part are considerably augmented. Febrile symptoms, as well as local inflammatory action of an asthenic kind, often appear, in various grades; and the disorganisation supervenes and extends with increased rapidity. The gangrene may attack several parts of a leg, or even both legs; but it very seldom appears in the feet or toes. It rarely implicates any other tissue than the cellular, always beginning in the more superficial parts of it, to which this lesion is chiefly confined. In addition to the interrupted circulation through the heart, the veins are inordinately pressed upon by the serum accumulated in the cellular areolæ between them and the stretched integuments; and the return of blood through them is thus further retarded. The distension, also, of the cellular tissue by the serum impairs the vital cohesion and power of resistance it previously possessed, and disposes it to experience a state of asthenic inflammatory action terminating rapidly either in gangrene or in some one of those sloughing abscesses described in the articles Abscess, and Cellular Tissue.

26. iv. From Lesion of Nerves. — Gangrene has been supposed, by modern pathologists, to be sometimes occasioned by the loss of nervous influence, from injury or disease of the spinal cord, or of the nerves of a limb. Tommasini has even supposed that the inflammation of the nerves of a part is the cause of gangrene in all cases of acute inflammation terminating in this manner. But, we have no proofs of the accuracy of these views. Indeed, facts militate against them. There are numerous instances of the loss of the cerebro-spinal nervous influence of a limb, without much detriment to the functions of circulation, nutrition, and animal heat in it, when it has not been subjected to pressure. These functions are entirely dependent, as I have shown many years ago (*Lond. Med. Repos.* May, 1822), upon the supply of the organic or ganglial nerves to the arteries, and are but slightly influenced by the cerebro-spinal nerves of the limb. Besides, many cases of inflammation of nerves have been observed, but gangrene has been very rarely seen to supervene, and even then, it has arisen from the extension of the inflammation to adjoining parts, more particularly to the blood-vessels. Phlebitis, and even artereitis, especially the former, are most prone to occur in females soon after childbirth; and the great majority of the cases of these diseases I have seen were consequent upon flooding. A similar cause is influential in the production of neuritis; and I have witnessed instances, where the affection of the limb was evidently this latter at the commencement, but complicated with disease of the blood-vessels in an advanced stage. One of these occurred in the practice of Mr. John Davies, and was seen by me several times. In it gangrene came on; the limb was amputated by this very able practitioner; and the extent of lesion ascertained upon examination after death. M. Dugés (*Rév. Méd.* t. iii. 1824, p. 177.) mentions a case of neuritis, in a female, after parturition, complicated with flooding. The upper portion of the sciatic nerve was the seat of the disease; and the parts in the immediate vicinity soon become livid and œdematous. The dissection demonstrated inflammation of the nerve and gangrene of the adjoining tissues. A similar case is adduced by M. Martinet (*Rév. Méd.* Juin, 1824). In it, besides distinct marks of inflammation of the superior part of the sciatic nerve, gangrene of the adjoining structures was observed after death, to a considerable extent below the diseased portion of nerve; the affection of the nerve having been anterior to the gangrenous alteration.

27. v. Gangrene from various Physical Agents. — (*a*) Severe contusions, or other local injuries — (*b*) powerful stimulants or irritants, or other chemical agents — and (*c*) excessive heat or cold — either directly or indirectly cause the

death of the parts on which they act. — *A.* The *first* of these falls within the province of the surgeon. It may, therefore, be only remarked that, when the injury is very severe, nervous influence and circulation may be so entirely annihilated as to prevent the return of action, and to cause the immediate death of the part. Contusions from spent shot &c. are often followed by this effect. But when the injury is less violent, the capillaries of the part have their tonicity impaired, and become congested; reaction of the larger vessels supervenes, owing to the consequent obstacle to the circulation, and to the effects of the injury on the adjoining parts, and increases the congestion of the capillaries; and the effect of this reaction, upon the injured and congested capillaries, is to exhaust their remaining vital endowment, and to produce gangrene of the part. In these cases, the surrounding tissues are inflamed; a separation of the gangrened portion takes place, as soon as its vitality is altogether extinguished, and as the lymph effused by the inflamed capillaries limits the extension of the lesion; and the whole phenomena are the same as in sphacelus from very acute inflammation.

28. *B.* Powerful *stimulants, irritants,* and *chemical agents,* produce gangrene somewhat differently, according to their modes of action on the living tissues. — Stimulants act more especially upon the nervous endowments of the part, and, by excessive excitation, exhaust them; but they cannot induce gangrene unless they destroy the vital properties of the capillaries; and they can effect this only by previously causing intense inflammatory action, the consequent gangrene being the effect rather of this action than of the stimuli which excited it, although the frequency, and, indeed, certainty, with which the result will follow the cause will much depend upon the kind of stimulus. Thus, both liquor ammoniæ and spirits of turpentine will inflame the parts to which they are employed; but inflammation produced by the former will often pass into gangrene, and that caused by the latter will very rarely terminate in this manner. -- The same remarks apply to irritants. These act more directly upon the capillaries, the gangrene being always a consequence of inflammatory action, in some one or other of its states, produced by them. Chemical agents, according to their nature, are often more complex in their operation; some of them both exciting the vital actions, and altering the intimate organisation of the part. Acids, alkalies, various neutral salts, both mineral and alkaline, &c. excite, and soon exhaust or extinguish, the vital properties of the parts with which they come in contact, with a rapidity, and to an extent, according to their concentration or activity. When much concentrated, especially alkalies and acids, they destroy the organisation of the part before its vital properties fully evince the effects produced upon them; the surrounding tissues, however, becoming inflamed, in consequence of the injury inflicted, and of the interruption of the circulation at the point where the obstruction of the vessels by the action of these agents commences. Alkalies produce gangrene very differently from acids. The former soften, dissolve, and combine with the ultimate organisation of the part, and render its fluids still more fluid; the latter constringes, corrugates, and condenses the structure, and coagulates the fluids in it. Both ultimately destroy the intimate constitution of the solids and fluids, and thereby annihilate the properties or functions resulting therefrom; but in the different ways just stated. The surrounding parts become inflamed owing to the obstruction at the limits of disorganisation; the vascular action varying somewhat in degree, and perhaps also in kind, with the nature of the agent, the extent of injury, and the circumstances proper to the individual. — When sphacelation results — for sphacelation is the effect rather than gangrene, particularly when these agents are concentrated — the colour varies according to the agent and quantity of blood in the part on which it has acted. A lighter colour of the dead part is produced by alkalies than by acids; a dark brown or black hue following the latter, particularly when applied in a concentrated state to mucous or vascular tissues. Alkalies generally produce a greyish, yellowish grey, or ash colour of the parts which they destroy.

29. *C. Gangrene from Extremes of Temperature.* — *a. Excessive heat,* if it be no greater than 220° or 230°, vesicates the part, and produces gangrene by the inordinate excitement of the nerves of the part, and the consequent vascular action. Higher grades of heat excite the nerves and capillaries still more intensely, and exhaust their vital properties with greater rapidity, the contingent sphacelus appearing more quickly and extending more deeply. In proportion as the temperature is increased, so is the consequent gangrene more entirely the result of the operation of heat, and less the effect of inflammatory action; the higher grades annihilating the vital properties, as well as destroying the structure of the part before reaction can take place in it. But, in most instances, unless death follow in a very short time, inflammatory injection and reaction in the surrounding tissues appear, and increase the extent of the gangrene and of the consequent sphacelus. — When the injury is not such as to occasion death in two or three days, the sphacelated part is separated from the living, and an abundant suppuration takes place from the living inflamed surface; but this seldom occurs in less than five or six days. The loss of substance is generally only partially repaired; a fibro-cellular tissue being formed, which contracts as it becomes more fully organised, occasions deformity, and interrupts the functions of the part.

30. *b. Intense cold* acts very differently from excessive heat in the production of gangrene. It affects chiefly the vital functions of the organ, and does not occasion disorganisation although it causes congelation of the fluids and soft structures. Gangrene seldom follows a diminution of temperature short of producing congelation, unless as a consequence of the inflammation intermediately occasioned. When the cold is great, the parts exposed to it, especially those furthest removed from the centre of circulation, have their vascularity diminished, and become pale, constricted, and numb. Motion and sensibility are afterwards lost, and the parts are even frozen in the more extreme cases. If the exposure to the cold continues, the congelation advances; the functions sink progressively, and a state of apathetic lethargy comes on, terminating in unconsciousness and death (see art. COLD). In this case, gangrene

is not developed. It is not until the frozen part is thawed, or exposed to heat, that gangrene is manifested. The vitality, reduced or extinguished by the diminution of temperature, cannot be restored in all the affected tissues. The blood becomes again fluid, but it has lost its crasis, and separates into serum and coagulum in the smaller vessels. Sensibility, motion, and animal life do not return. The skin covering the part assumes a livid or brownish red colour; phlyctenæ appear on its surface; with grey, purplish, or black spots, indicating the passage of the gangrene into sphacelus. The living parts closely adjoining the gangrene are now injected and inflamed; the vascular reaction which they experience exhausting the remaining vital properties, especially of the capillaries, and extending the mortification, as in gangrene from inflammation. In slight cases, although congelation may have taken place, the circulation and sensibility of the part is often restored; a tingling or pricking sensation is felt; reaction supervenes, and even becomes excessive; and, owing to previous reduction of vital power, and the consecutive action, exhaustion of the affected structure, followed by lost power of the capillaries, diminished cohesion of the tissues, coagulation or other change of the blood in them, and by gangrene, soon afterwards appears. In these cases, the external changes are altogether similar to those just described; but the extent of mortification depends upon the constitution of the patient, and the violence of the antecedent and attendant inflammation.

31. vi. GANGRENE FROM POISONS. — The poisonous substances to which attention will be here directed, are — 1st. Diseased vegetable productions; 2d. Diseased or decomposed animal matters; and, 3d. The poisons generated by certain animals. — *A. Gangrene from Diseased Grain* is sometimes seen among those who live chiefly on rye. Of the general effects of this and of other grains, when used in a diseased, unripe, injured, or mouldy state, some notice is taken in the article ERGOTISM. But the influence of *spurred rye* in causing gangrene requires a particular notice at this place. *Spurred rye,* when used with the sound grain as food, produces, according to the quantity, somewhat different effects — either *convulsive* ergotism, or *gangrenous* ergotism. But both these species of disorder may be associated, or the former may be followed by the latter, either of them existing in various grades. Indeed, the gangrenous disease is generally preceded, or even attended, by some degree of spasmodic affection.

32. *A. Gangrenous Ergotism — Necrosis ustalaginea,* SAUVAGES — *Gangrène des Solognois* — has been observed both sporadically and epidemically. It has been supposed that the epidemics which appeared in various parts of Europe during the middle ages, and were denominated *Ignis Sacer, Saint Anthony's Fire, Mal des Ardens,* &c., were occurrences of this variety of ergotism in a severe as well as epidemic form. The gangrene and separation of the limbs mentioned with respect to them countenance this supposition. It was not, however, until the epidemic of Hesse, in 1596, that the effects of spurred rye on the œconomy were fully recognised by physicians. In 1630, an epidemic gangrene appeared in Sologne, and was traced to this cause by THUILLIER. Subsequent occurrences of this malady, in different parts of France, Switzerland, and Germany, have been described in connection with this cause, by PERRAULT, DODART, BRUNNER, NOËL, LANG, DUHAMEL, SALERNE, READ, and others. — The experiments performed by TIESSIER in 1780, and the facts detailed by IANSON in 1818, have further elucidated this subject.

33. Gangrenous disease from the use of spurred rye generally commences with vertigo, faintness, diminished sensibility, and slight convulsive or spasmodic movements — with the chief symptoms of spasmodic ergotism. But it is sometimes not preceded by any of these. In this case, it is ushered in by lassitude and weakness of the lower extremities, with deep-seated pain, increased by heat, and aggravated during night. There are occasionally, at this period, slight swelling, but without redness; and, in some instances, even a wasting of the extremities. The temperature, motions, and sensibility, of the parts are afterwards lost, although the deep-seated pain still continues. The integuments now become wrinkled from the shrinking of the parts contained by them. Phlyctenæ appear on the surface; the skin assumes a violet, livid, or black hue — not, however, in all the places affected, but first in the heel, feet, or various parts of the thighs or legs. Sometimes the gangrene extends from the upper portions of the limbs to their extremities; or from the more internal structures to the integuments; and in other cases it proceeds from the toes upwards. When it reaches the trunk, and often before it advances so far, the patient sinks. It generally proceeds gradually, and is not limited to the lower extremities, the upper being often affected. When it is arrested, an inflammatory circle forms around the dead part; and, at the points of separation, an abundant and very fœtid suppuration is established. — The gangrened portions are dry, hard, and shrunk. A whole limb may be thrown off in this state without the loss of a drop of blood.

34. Gangrenous ergotism seems, from the early effect produced by its cause upon the nervous system — from the spasmodic contractions, insensibility, weakness of mind, and fatuity, often accompanying it — to arise, in a great measure, from lesion of this system. The circulating fluids are evidently also deteriorated; the affection of the nervous system being probably caused by the change in the blood. Whatever that change is, it may be supposed to affect also the blood-vessels, particularly those most removed from the centre of the circulation. But the vessels, as well as the internal viscera of persons who have died of this disease, have not been investigated. In this state of ignorance as to the morbid appearances after death, several opinions have been hazarded as to the nature of the alterations which terminate in this manner. Some suppose that inflammation of the blood-vessels is produced; and others contend that the existence of inflammatory action is not indicated by the descriptions given by observers of the disease. Without the data furnished by the minute examination of the blood-vessels and nerves after death, all speculation as to the nature of the disease must be inconclusive.

35. *B. Gangrene from Diseased or Decomposed Animal Matters.* — Mortification may take place

from these causes in one or other of the following circumstances: — 1st. It may result from the absorption of gangrenous or morbid matter from a different part of the same frame; in which case the consecutive gangrene is generally seated in some internal organ, as the lungs, spleen, liver, &c. — 2d. It may follow the application of putrid or diseased matter to an abraded surface, or by puncture, as in dissection, wounds, &c. — 3d. It may be occasioned by exposure of a wound or sore to foul air; or by the constitutional affection produced by the respiration of air loaded with decomposed animal matter, as in hospital gangrene: — and, 4th. It may follow the contact of a diseased secretion, either with or without abrasion of the cuticle. I shall consider separately gangrene occurring in each of these ways.

36. *a*. When mortification follows compound or other fractures, or amputations, inflammation, &c., a similar occurrence to that which I have noticed, when treating of abscesses (see art. ABSCESS, § 27.), may take place — a portion of the sanious fluid may be carried into the blood, and give rise to internal gangrene, without any appearance of previous inflammation of the consecutively gangrened part. — Upon examination after death, this part is found in some instances livid, brown, or black, in one or more circumscribed portions, and somewhat condensed, particularly if the lungs be the organ thus consecutively altered; and in others of a dirty grey or slate colour, and soft or pulpy. Occasionally this latter state appears to have been the advanced stage of the former. — In several cases, the diseased part is reduced to a sanious, or almost fluid condition; and changed to a reddish brown, or dark brown colour. In all these states, the surrounding tissues may not be at all changed; the gangrened portions varying in size and in number. — In these cases, the sanious matter, which has passed into the circulation, has induced congestion of a portion of an internal parenchymatous organ, and so impaired the vital properties of the congested capillaries, as well as of the organ itself, as to cause them to pass directly into a state of gangrene, without intermediate reaction of the vessels, either in the affected part or in the surrounding structures. The above states of *consecutive gangrene*, I have seen after sphacelation affecting the extremities, or parts pressed upon in low fevers, especially those covering the sacrum.

37. *b*. The application of putrid or morbid matter to an abraded or punctured part often produces a septic or contaminating effect, especially upon cachectic or previously disordered constitutions. Putrid vegetable or animal substances, and various morbid secretions, when thus applied, may occasion, in the first instance, erysipelas, or diffusive inflammation of the cellular tissue, quickly passing into gangrene. The wounds received in dissections, particularly of stale subjects, or of bodies dead more than twenty-four or thirty hours, are sometimes followed by gangrenous inflammation of the cellular tissue, attended by irritative or low fever. The disease, caused by wounds or punctures received in the examination of recently dead bodies, particularly those who have died in the puerperal state, or from inflammation of serous membranes, although much more dangerous than that which occurs in the foregoing circumstances, is seldom attended by gangrene even in fatal cases (see POISONS—*Animal*); or if it be, this lesion is the least important part of the malady.

38. *c*. Wounds, injuries, and sores are not infrequently affected by gangrene in circumstances favourable to the contamination of the air, to imperfect ventilation, and to the production of humidity, in the apartments where persons thus injured are confined. — *Hospital gangrene* is most frequently generated in this manner; for, although the fluids of the diseased part will produce it, when they come in contact with an abraded surface, or possibly, even, when they are for any time applied to the sound skin, yet I believe that it is chiefly owing to the solution of putrid animal miasms, in the humidity of the surrounding air, that the disease is communicated in the wards of an hospital. Hence the mischief of wetting the floors of wards too often, when numbers are confined in them with injuries, &c., as respects the production both of erysipelas and of gangrene. — I am of opinion, that the close and foul air generated by the discharges from suppurating or gangrenous surfaces, will favour the production of gangrene, in injured parts, by lowering vital power and deteriorating the circulating fluids; and thereby inducing a state of system similar to that in which putro-adynamic fever originates, or by which it is characterised.

39. When *hospital gangrene* commences in a sore or part with which the foul air comes in contact, it is evinced by a change of colour, which, however, differs in different cases. In some, it begins with a certain degree of pallor, and the exudation of a dirty, pale grey matter, occasionally interspersed with specks of blood. In other instances, it presents a livid hue; and, in nearly all, it is swollen and painful. The surrounding parts soon undergo similar changes: the integuments have an erysipelatous appearance, and, with the subjacent cellular tissue, are soon converted into spongy, dirty grey sloughs. The separation of the sphacelated parts is generally attended by an exudation of blood, or by more copious hæmorrhages, owing to the adynamic state of constitution preventing the inflamed part from forming coagulable lymph, whereby the extension of the gangrene may be limited, and the hæmorrhage prevented. The state of asthenia or putro-adynamia, produced by the causes just named (§ 38.), favour the extension of the mortification, the further contamination of the blood and the recurrence of hæmorrhage. When a considerable vessel is destroyed, the absence of coagulable lymph gives rise to losses of blood, which further sink the patient; and a recourse to the tourniquet, in order to arrest the bleeding until the vessel is tied, accelerates the death of the limb, which soon becomes swollen, completely sphacelated, and intolerably offensive.*

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* Mr. COPLAND HUTCHISON, in a most instructive chapter on Hospital Gangrene, in his *Surgical Observations*, details a case of a man, who had been the subject of extensive exfoliation of the left parietal bone, exposing the *dura mater* to the extent of two square inches and a half, and who was infected by hospital gangrene of the exposed part. In about three days the *dura mater* was destroyed, and the brain itself attacked. The brain came away, broken down in its structure, as if it had been mixed with dark-coloured vinegar, and emitted a disagreeable sour gangrenous smell. The man lost half a tea-cupful of brain before fever and delirium came on. He died on the

40. *d.* The morbid fluids and secretions of several of the lower animals often produce very serious effects when applied to the denuded surface, or even to the sound skin; and these effects are generally attended or followed by gangrene of the part with which they come in contact. The occurrence of *Malignant* Pustule (see the article) is an illustration of this fact. The application of the blood or raw flesh of a diseased animal to a part will often occasion gangrenous inflammation of it, although the flesh of these animals may be eaten with impunity when cooked. Of this, various instances have been adduced by Morand, Dupuy, Leuret, Hamont, and others. I believe that, in all cases of the production of gangrene by morbid secretions and other fluids — whether of the lower animals or of man—the local as well as the constitutional effects produced by them are most virulent, when they either proceed directly from the living animal, or act very soon after death; and that they are less injurious when they have undergone the changes constituting incipient putridity or decomposition.

41. *C. Gangrene from poisons generated in healthy animals*, as in the viper, rattlesnake, &c., commences and proceeds with amazing rapidity, upon insertion of the poison, and with remarkable depression of the vital manifestations of the constitution, as well as of the part thus inoculated. The insertion of the poison induces intense pain, which rapidly extends; swelling and hardness of the cellular tissue; dark redness at the point of injury, soon followed by a spreading livid discolouration; and diminution of temperature. — The skin is rapidly covered by phlyctenæ; the cellular tissue becomes soft, and crepitates on pressure; and the puncture discharges an offensive sanious fluid. Almost immediately upon inoculation of the poison, and co-ordinately with the rapidity and extent of the local action, an intense effect is produced upon the whole frame (§ 50.).

42. II. Of the Constitutional Symptoms of Gangrene. — The states of vital manifestation throughout the system, vary somewhat in each of the forms and circumstances, in which gangrene and sphacelus appear. I shall, therefore, take a very brief view of those which are usually seen in most intimate union with each of these forms.—*A. Mortification from inflammation* presents no uniform relation to the severity of the local action, or of the sympathetic constitutional disturbance, although such relation obtains in a general way. — Inflammation of much intensity, in a constitution previously debilitated, or in a habit of body already cachectic, or during a deteriorated state of the circulating fluids, is always more or less liable to terminate in gangrene. Its occurrence also, in a highly sanguine, irritable, and plethoric state of the system, particularly when this state has been induced by living highly, or by the excessive use of intoxicating liquors, is a no less unfavourable circumstance; and, equally with the foregoing liabilities, should be taken into account when symptoms indicative of this termination appear. In the former class of occasions, in which gangrene may occur, the inflammation, although slight or limited, may nevertheless be excessive, relatively to the state of vital power and of resistance to injurious impressions or actions: in the latter, there is always a disposition to intensity of action so great as to quickly exhaust the vital properties of the vessels; if this intensity be not promptly reduced, and the consequent exhaustion either anticipated or promptly met by local or general means appropriate to the peculiarities of the case.

43. To detect the commencement of gangrene in any internal viscus is by no means so easy as it has been represented by many writers, who, merely copying or compiling from one another, have thereby often perpetuated error. The *sudden sinking*, so often insisted upon, attends various other pathological conditions besides gangrene; and, even when it is observed in connection with this lesion, it may be the attendant of that change in the state of vital power, of which gangrene is only one of the remote consequences. — When this symptom appears somewhat suddenly, it indicates one or more of three states; — *α*. It may depend upon the depression of organic nervous power, generally as well as locally; — *β*. It may arise from commencing gangrene; — *γ*. And it may be caused by the passage of morbid or putrid matter into the blood. The *pulse* varies on the accession of gangrene, with the previous grade of local action and of attendant fever. When action has been very high, the pulse retains its frequency, but becomes weak, small, soft, and very compressible, and ultimately irregular, intermittent, or even slow, just before death. When there has been but little previous fever, the pulse is very feeble, undulating, unequal, intermittent, and slow; but it is readily affected, in either case, by mental or physical impressions. The *animal heat* sinks rapidly with the pulse when gangrene supervenes; the extremities becoming cold, and the surface covered with a clammy perspiration or sweat, which is cold and raw as dissolution draws near. If the antecedent symptomatic fever have been slight, the *mind* may be undisturbed to the very last; if severe, delirium, picking at the bedclothes, stupor, coma; accumulations of mucous sordes on the tongue, teeth, and lips; fœtor of the breath, and even of the body; and unconscious evacuations, for a longer or shorter time before death, are not infrequent.

44. Besides these, various other symptoms appear, but without any uniformity or constancy. These are, faintness or syncope, particularly when the head is raised; hiccup; vomitings, sometimes without severe retchings, or a passive rejection of matters from the stomach; a peculiar gangrenous odour exhaled from the body, and from the excretions; a sunk, collapsed, pinched, and cold state of the features; a dusky, lurid, and sometimes a jaundiced, appearance of the skin; tympanitic distension of the abdomen; offensive eructations; an emphysematous state of parts; wandering delirium, especially at night, or various passing delusions; tremblings or shudderings; and restlessness, or laborious hurried respiration. An offensive gangrenous odour of the expired air is very remarkable when gangrene occurs in the lungs; but it may accompany this lesion in any other part, if a portion of the morbid or decomposed matters pass into the circulation. In this case, all the excretions — pulmonary, cutaneous,

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10th day from the attack of the gangrene. The whole of Mr. C. Hutchison's observations on this disease are results of most extensive experience, and are very interesting.

intestinal, and urinary — will be rendered more or less offensive, and they may even exhale a gangrenous or putrid fœtor.

45. *B.* In *mortification from debility*, or from *deficient or unwholesome food*, not only are the vital manifestations generally impaired, but the fluids and solids also are frequently in a state of obvious disease, before gangrene occurs, particularly in low fevers, scurvy, &c. In such cases, the general adynamia, as well as the deterioration of the fluids and solids, are rapidly augmented with the accession of this lesion, and most of the symptoms already noticed are also superadded. The pulse, temperature, and mental powers are affected in the manner just described. The previous and attendant asthenia, and the consequent alterations in the blood — which is incapable of coagulating, as it escapes from the diseased part — favour the recurrence of hæmorrhage, the extension of sphacelation, and the further contamination of the fluids from the transit of putrid matters into the circulation, by preventing the formation of coagulable lymph. The more obvious effects of these states are, accelerated sinking of the vital functions, offensive diarrhœa, and various other contingent phenomena, mentioned above (§ 44.), as indicating approaching dissolution. — When *inflammation of the nerves* seems connected with the production of gangrene, great pain, high irritative fever, watchfulness, &c. precede the sinking, irritability of stomach, and weakness or irregularity of pulse, attendant upon this change.

46. *C.* When *obstructed circulation in the arteries* occasions gangrene, the symptoms depend very much upon the cause of obstruction. — *a.* If *acute artereitis* (see ARTERIES, § 27. *et seq.*) produce it, severe inflammatory or irritative fever precedes it, and, on the accession of it, changes into fever of a lower type; watchfulness, sometimes delirium, and most of the symptoms already noticed, supervening. — *b.* When *ligature or rupture of an artery* causes gangrene, the constitutional affection is not severe at first; but in two or three days, or in a shorter time, fever of a low type appears, with more or less disturbance of the nervous system, occasionally with delirium, discolouration of the general surface, and sinking of the vital powers, until either dissolution follows, or restoration and separation of the gangrened part takes place. — *c.* In cases of gangrene from *ossification and obstruction of the arteries*, the constitutional symptoms increase slowly until they ultimately indicate great prostration of the vital powers. In some instances, the progress is at first slow, and afterwards very rapid. In an early stage of the gangrene, slight irritative fever is sometimes observed; but discolouration of the surface, diarrhœa, sinking, hiccup, irritability of stomach, and the other usual attendants on sphacelation, afterwards appear; the progress of the constitutional affection being seldom arrested, or the separation of the dead parts effected.

47. *d.* Whatever peculiarity *gangrene from obstruction of the veins* presents as to the constitutional symptoms, belongs entirely to the nature of the obstruction. — If inflammation of the veins have occasioned it, the symptoms, local and general, of phlebitis will have preceded it, and the advanced phenomena will not differ from gangrene consequent upon internal inflammations, excepting that the powers of life will be more disposed to rally, and to separate the dead from the living parts. — Gangrene caused by *pressure upon the veins*, often takes place without any previous or attendant febrile action; the vital depression and other symptoms of this lesion supervening upon the congestion, serous infiltration, &c. more immediately produced by the obstruction. — *e. Internal strangulations*, however, and *intus-susceptions* of a portion of the intestinal canal, give rise to a different train of symptoms. In these, the pressure acts also upon the nerves and arteries; and the exquisite pain and tenderness, irritative fever, restlessness, and vomitings, followed by cessation of pain, by singultus, eructations, faintness, cold sweats, extreme weakness of pulse, &c., indicate the accession of gangrene. — *f. Interrupted circulation through the heart*, occasioning gangrene, is not preceded by febrile symptoms: the constitutional changes in this variety at first depend upon the disease of the heart, and become subsequently associated with those arising from impeded circulation of blood in the veins, serous infiltration, and the consequent pressure and gangrene. The progress of the local and constitutional affection is slow, but sometimes rapid at an advanced stage.

48. *D.* — *a.* The *action of heat* upon the constitution in producing gangrene, is proportioned to the violence and extent of local injury. — Excessive burning pain, hard pulse, thirst, and the usual attendants upon symptomatic inflammatory fever, follow the less violent injuries from this cause, heighten the local inflammation, and exhaust the vitality of the affected vessels. When gangrene is about to occur, or has supervened, the fever changes to the nervous form, often with delirium or mental agitation, followed by stupor, or convulsions when children are the subjects of this injury. In very severe burns, or where a very large surface has been scalded, these latter symptoms immediately follow the shock sustained by the constitution, from the extensive local injury inflicted; and often terminate fatally in a period varying from a few hours to two or three days. The severity and character of the constitutional affection, however, vary with the state of the patient and the situation of the injury. When the injury is over the great cavities, its effect is much more severe, *cæteris paribus*, than on the extremities.

49. *b. Gangrene from cold* is often attended by very slight constitutional disorder, when only the extremities have been exposed or affected, or when the cause has been removed soon after these parts had become benumbed or frozen. But when the whole body has been exposed to cold, particularly in a state of repose, or when the exposure has continued long after these effects have been produced, lethargy, stupor, insensibility, frequently passing into death, generally supervene in succession. It is when local inflammation or reaction appears, in the previously benumbed or frozen part, or in the living tissues adjoining, that fever takes place. But as soon as the inflamed part becomes gangrenous, the fever assumes the nervous character. In this variety, however, as well as in that from burns, the degree of consequent adynamia depends very much upon the previous state of the patient, physically and morally; upon the severity of the injury; and upon the extent

of the gangrene, and the rapidity of its accession and extension. Where want, improper food, and intemperance have already produced their effects on the frame, the constitutional commotion attendant upon the injuries produced by the extremes of temperature, generally presents more of a nervous character throughout, than in other circumstances, with a rapid, small, weak and irregular pulse; and frequently with tremor, delirium, or even both, or with more or less agitation. — *c. Chemical agents* affect the system chiefly by the inflammation they excite in the part to which they are applied; unless the injury is extensive or violent, when the symptomatic effects will nearly resemble those caused by extensive burns (§ 48.).

50. *E. Gangrene from poisons* is always preceded and attended by severe constitutional affection. — *a.* That occasioned by *spurred rye* is generally preceded by lassitude, faintness, weakness of the senses, vertigo, spasms, and symptoms of general adynamia, manifested both in the vital and animal functions. Sleep is prevented, by the severe pains in the limbs. The powers of mind are generally impaired; and, with the appearance of gangrene in the extremities, all these symptoms are increased, until the patient sinks into insensibility, or dies in a state of syncope. — *b. Gangrene from putrid or diseased animal matters* is preceded, as well as attended, by the severe constitutional effects, described in the articles on *Diffuse Inflammation of the* CELLULAR TISSUE, ERYSIPELAS, *Malignant* PUSTULE — either of which may be produced by these matters — and more fully elucidated in those on *Putro-adynamic* FEVER, and *Animal* POISONS.

51. *c. Hospital gangrene* is always attended by adynamic fever; and, in the circumstances alluded to above (§ 38.), it is often preceded by more or less depression of nervous and vital power, although rarely by prominent febrile symptoms. Derangement of the digestive functions, sometimes diarrhœa, a quick and feeble pulse, and physical and mental depression, generally usher in, and attend, the early progress of this gangrene. Dr. HENNEN states, that men who had borne amputation without a groan, shrunk at the washing of their sores, shuddered at the sight of a dead comrade, and even predicted their own dissolution, sinking into sullen despair. Towards a fatal close, prostration of all the vital manifestations, faintings, diarrhœa, vomiting, hiccup, delirium, discolouration of the general surface, insensibility, coma, cold clammy sweats, involuntary evacuations, &c. successively appear.

52. *d.* The *poisons of reptiles* occasion a sense of sinking at the epigastrium, oppression in the præcordia, laborious breathing, vertigo; pains in various parts of the body, particularly in the stomach, bowels and head; vomitings, diarrhœa; impaired vision and sensation; with a small, feeble or intermittent pulse. To these succeed, extreme sinking and anxiety at the epigastrium and præcordia, great thirst, syncope, singultus, offensive fœtid breath, a jaundiced or sallow state of the skin, coldness of the extremities and of the general surface, clammy sweats, insensibility, and death, unless the progress of vital depression be arrested by the most energetic means.

53. III. PROGNOSIS.—The prognosis, although generally unfavourable, varies with the different circumstances in which gangrene presents itself; and the extent to which it has proceeded. — *a. Gangrene consequent upon inflammatory action* is commonly fatal when an internal organ is affected, especially when the general excitement suddenly subsides, the pulse becoming quickly feeble, small, or thready; the features pinched or collapsed; the surface lurid, sallow, or livid; the respiration laborious or difficult; and the perspiration or other excretions fœtid and gangrenous. Singultus, rejection of the contents of the stomach without effort, syncope, and involuntary evacuations, are indications of the near approach of dissolution. But all these phenomena are often manifestations merely of that state of local and general derangement, of which gangrene is the immediate result, rather than of gangrene itself — at least of gangrene to any extent; for dissolution may take place before this lesion is fully developed. — When this form of grangene is external, its extent is less an indication of danger, than the character of the constitutional disorder, and the disposition evinced by this lesion to extend. — In all cases, the habit of body, the age, modes of living and previous health of the patient, and the exciting cause and character of the previous inflammation, should be taken into account. If these are favourable, if vital action be not very depressed, and if a disposition to form coagulable lymph and to arrest the disease appear, recovery may be expected.

54. *b. Gangrene from debility*, from *disease of the nerves*, and from *obstructions of the arteries or of the veins*, should receive a guarded, if not always an unfavourable, prognosis; for, in these circumstances, although some cases may recover, the great majority will terminate fatally. When it occurs from *ossification and obstruction of the arteries*, or from *disease of the heart*, a fatal result will surely follow; although it may be deferred for some time, in a few instances. — *c.* When it is produced by any of the more common *physical agents* noticed above, a much more favourable event may be anticipated, unless the intensity of the cause, and the extent to which it has acted, have given a very severe shock to the system, have depressed vital power beyond the ability of resistance, and induced low nervous fever with cerebral affection.

55. *d. Gangrene from the use of spurred rye* requires a cautious opinion as to the result; for when the disease produced by this agent has given rise to this alteration, matters will frequently have gone too far to admit even of amelioration.— Nor is the prognosis very different, when the deleterious effects of any of the *animal poisons* mentioned above have become so manifest as to be attended by gangrene. The most energetic means alone can then arrest the progress to dissolution; and these may be rejected from the stomach, or fail, even when retained, of rallying the powers of life. In every circumstance in which gangrene occurs, irritability of the stomach is a most dangerous symptom. — In *hospital gangrene*, however, removal of the patient to a pure air, and an appropriate treatment, at an early stage of the disease, will be attended by success, in the majority of cases.

56. *e.* Of all the circumstances that should be

taken into consideration, in forming a prognosis, none is of greater importance than the disposition evinced by the surrounding parts to limit the extension of the gangrene by the formation of coagulable lymph. This should be viewed as a most favourable occurrence, particularly when the local alteration has not proceeded very far, nor depended upon disease of the heart, as it indicates restoration of vital power, and consequent vascular reaction, whereby the injury may be arrested and partially repaired.—On the contrary, spreading of the gangrene is most unfavourable—1st. As producing a greater extent of exposed surface and of injury by which the constitution will be injuriously impressed; — 2d. As arising from progressive sinking of vital power; — and, 3d. As favouring the passage of a portion of the dead or morbid matters of the sphacelated part into the circulation, and the consequent contamination of the whole frame, — circumstances exerting a most powerful influence in hastening a fatal result, especially if asthenic inflammation, general adynamia, or an animal poison, have occasioned the gangrene.

57. IV. Treatment.—i. The means of cure in gangrene refer — *first*, to the removal of the pathological condition which occasions it; *secondly*, to the state of vital action in the vicinity of the dead part; and, *thirdly*, to the state of constitutional disturbance. — *A*. If gangrene have been caused by *inflammation*, especially if it have proceeded to sphacelation, the state of constitutional power will then have become so far impaired after the more sthenic forms of inflammatory action, and so much the more reduced after the asthenic, as to require a very different mode of treatment from that which would have been quite appropriate, before the gangrene had taken place.—*a*. Although the part is about to pass, or has just passed, into gangrene, after the more sthenic states of inflammation, *bloodletting* may still be practised, but with caution, particularly in robust or plethoric persons, or when the pulse still continues hard or strong, or when the gangrene is external. In these circumstances, excessive vascular action, if not subdued by a moderate depletion, would exhaust the remaining power of the vessels of the part or of the surrounding tissues; and the extension of the lesion would be thereby caused with as great rapidity as in cases characterised from the commencement by deficiency of power. It is very different, however, when the gangrene has followed the more asthenic states of inflammation, or occurred in persons living in unhealthy situations and in very large cities; or when it has appeared in the dissipated and intemperate. Bleeding cannot be resorted to in these circumstances, and even lowering *purgatives* should be avoided. Yet recourse to purgatives is indispensable; the warmer or more restorative kinds, or a combination of them with tonics, being most appropriate. — In some instances, particularly when biliary collections may be presumed to have formed in the gall bladder or ducts, and when the part is merely in the incipient stage of gangrene, an *emetic* will precede the exhibition of a purgative with much benefit, especially in autumn.

58. *b*. It is principally when gangrene has just commenced, and been caused by the more acute forms of inflammation, in young or strong persons, that the *antiphlogistic regimen* should be prescribed; or, whilst the pulse still retains tone, and the surface presents an increase of temperature, the local change not having yet become associated with a general diminution of vital power. In this state, *diaphoretics*, conjoined with *opium*, or other *anodynes*, are also of much service, particularly after morbid secretions and fæcal accumulations have been freely evacuated by purgatives. They equalise the circulation, and, if judiciously selected, they improve the state of the blood; whilst the narcotic allays the morbid sensibility of the nerves of the part, and the general irritability of the system attending the early progress of this lesion. The nitrate of potash, subcarbonate of soda, with the spirits of nitric ether, and tincture of opium or of henbane, may, therefore, be prescribed in the camphor mixture, if the temperature of the skin continues above natural; or the same medicines may be given in the decoction of bark, or in the infusion of valerian, if the heat of skin be somewhat less. When the abdominal secretions are morbid, two or three grains of calomel, with as many of James's powder, may be taken at night, and a stomachic aperient the following morning, the solution of the acetate of ammonia, with the acetate of morphia in camphor mixture, or any aromatic water, being used during the day.

59. *c*. Internal gangrene is very rarely attended, even at its commencement, by a state of vascular action, requiring antiphlogistic remedies. It is chiefly when gangrene follows local injuries, in robust constitutions, and violent inflammation, or when it is attended by considerable excitement, that the above or similar measures are necessary. In other circumstances — as when it is consequent upon asthenic action, or when the antecedent inflammatory fever has assumed a lower grade — the treatment ought to be different or modified according to the states of action and of vital power. Surgical writers on gangrene, even up to the present time, have concerned themselves chiefly with the external manifestations of this lesion, without sufficient reference to the states of vascular action and of vital energy — to the changes in the organic nervous influence, in the circulating fluids, and in the abdominal secretions, which both favour its occurrence, hasten its progress, and modify its conditions. Hence the treatment of it has been viewed by them in a one-sided and an imperfect manner. Instead of agitating the question, as they have done even for ages, as to the propriety of bleeding, or of giving bark, at the commencement or during the progress of this lesion, they should have endeavoured to ascertain, if they did not know; and they should have informed us, if they knew; the circumstances requiring the one or the other, and the stages in which either ought to be employed. It is a matter of some astonishment to see practical writers of the present day differing so widely on this subject as they do—some prescribing bleeding, others cinchona, and many condemning all things besides their own methods or medicines, without considering the pathological states, for which either mode of treatment is most appropriate. The most important means of cure — whether bleeding, stimulants or tonics, amputating, external applications, &c.—have been

recommended for gangrene without sufficient reference to the states of vascular action and of vital power; or to the effect either of them may produce upon these states, and upon the disposition to limit or to extend the local disease; or to the influence they may exert in favouring the contamination of the circulating fluids, or in depurating the blood, and in promoting the functions of the principal secreting and excreting organs.

60. *d*. If the pulse be weak or soft, and the skin cool or moderately warm, the preparations of cinchona, serpentaria, and the muriate of ammonia; or the sulphate of quinine with camphor or ether; or the infusions of cascarilla, or of valerian, or of calamus aromaticus, with the chlorate of potash and chloric ether, will be requisite. At the same time, the excretions should be promoted by stomachic purgatives, as the compound infusions of gentian and senna, with the alkaline subcarbonates, and ammonia. — In a case which was ably treated by Mr. Morley of New Cavendish Street, to which I was called, this treatment was immediately efficacious. When diarrhœa is present, opium should be added to these tonics; or the chlorate of lime may be prescribed. In cases where the attendant inflammatory fever is about to pass into the nervous or putro-adynamic states especially if the gangrene have gone on to sphacelus, the exhibition of these, or of other tonics and stimulants, should not be delayed too long, otherwise the adjoining vessels may not be enabled to exert that degree of sthenic action requisite to the formation of coagulable lymph, whereby the extension of the lesion may be limited, and the absorption of morbid matters and the consequent contamination of the blood prevented. The stomach may become so irritable, when vital depression is not arrested sufficiently early, as not to retain the medicines most likely to be serviceable. This occurrence should be as far as possible prevented, as being most dangerous in itself, and as favouring the passage of morbid matters into the circulation. When it has appeared, I know nothing more efficacious in diminishing it than ammonia, large doses of Cayenne pepper, and opium, generally combined, and given in the form of pill. Warm wine and water, or brandy and water, with Cayenne, or other hot spices; or the acetate or muriate of morphia, with aromatics, may likewise be employed. Upon the whole, inflammatory gangrene, at an advanced stage, or gangrene consequent upon asthenic inflammation, or attended by the usual symptoms of adynamic fever, requires a very similar treatment to that which I have advised in the advanced periods of *Putro-adynamic* Fever (see that article).

61. *B*. The constitutional treatment of *gangrene from debility* and deterioration of the circulating fluids (§ 16.) consists chiefly in the exhibition of tonics and stimulants; of the chlorates of potash, and of soda; of camphor, musk, and ammonia, with opium and capsicum; and of the other restoratives mentioned above (§ 60.); and differs in no respect from that advised, in diffusive inflammation of the *cellular tissue*, in the adynamic states of *erysipelas*, and in the typhoid forms of *fever*.

62. *C*. When *disease of the nerves* threatens the production of gangrene, the morbid sensibility usually present requires the exhibition of opiates in large doses, frequently with camphor, or ammonia, or the subcarbonates of the fixed alkalies and warm aromatics. Even on the threatened accession of this lesion, local depletions may be still required. Purgatives are generally beneficial. Warm anodyne fomentations may be applied to the limb, at this period; and the other external remedies of which mention will be made hereafter should be afterwards employed, particularly if the part pass into sphacelation. In other respects, the treatment should be conducted conformably with the principles developed above.

63. *D*. The treatment of *gangrene from obstructed circulation*, through either the vessels, or the heart, depends much upon the seat and cause of obstruction. — If inflammation of the arteries and veins be concerned in producing it, the means of cure ought to have reference to the states of vascular action and of vital energy, as in gangrene from inflammation; but, in respect to phlebitis especially, vital power and resistance should be so liberally supported, as to enable the vessels to form coagulable lymph, in order to limit the extension of the lesion, and prevent the contamination of the fluids. — When it is caused by *strangulation* of, or *pressure* upon, the veins, the treatment must entirely depend upon the states of vascular action and of vital power. The former ought not to be allowed to continue high, nor should the latter be permitted to sink, without having recourse to means to support the one, and to lower the other. — For senile gangrene, or that arising from *ossification* of, and impeded circulation in, the arteries, little beyond palliation of the urgent symptoms can be effected. The same remark applies to that caused by *disease of the heart*. Opium or the salts of morphia, either alone or conjoined with camphor, musk, ammonia, or similar substances; the alkaline subcarbonates, or the sub-borate of soda, with anodynes; tonics, antispasmodics, or stimulants, conjoined with these; attention to the digestive and excreting functions; the horizontal position; and farinaceous or milk diet may be severally employed in both these forms of gangrene.

64. *E*. *Gangrene from physical agents* should be treated according to existing states of local and general action and of vital power, which have been shown above to differ very materially according to the severity, seat, and duration of the injury. — That caused by *burns* requires bloodletting, if the vascular excitement be great. But action, in these cases, although high, is seldom attended by much power. Therefore vascular depletion should be practised in moderation and with caution; the nervous excitement and irritability of the system requiring the chief attention; for, if allowed to proceed, they increase remarkably the severity and extent of the local injury. When the shock sustained by the constitution has been severe, depletions will be injurious. In these cases, restoratives ought to be administered, generally with opium or other anodynes. These latter are required, in most cases, and they should be aided by such local means as will allay the painful heat and sensibility of the part. In severe injuries of this kind, the alarm of the patient, and the excitement directly produced by them, commonly occasion an appear-

ance of vascular reaction, which may mislead: but it generally subsides in a short time, especially if a full dose of opium is administered. When febrile action appears at a later period — after the immediate shock and alarm have subsided — and is symptomatic of the local inflammation, general or local depletions, purgatives and diaphoretics are then necessary. — The internal treatment of gangrene produced by cold, as well as of that caused by chemical agents, should be directed conformably with the principles already stated.

65. *F. Gangrene from poisons* requires more, perhaps, than any other form of this lesion, the use of internal remedies. — *a*. That occasioned by *spurred rye* is evidently connected with a deteriorated state of the circulating fluids, the affection of the nervous and vascular systems being consequent upon this state. Therefore the means of cure should be directed to the removal of this condition; and those already mentioned (§ 60, 61.) may be tried with this intention; especially the combination of the chlorides, with antispasmodics or tonics and narcotics. The opinions of writers who have had some experience in the treatment of this disease are very contradictory. Some advise emetics, bloodletting, and antispasmodics; others, narcotics and antispasmodics; and many, stimulants and tonics. This diversity is most probably the consequence of the different effects produced by the same means of cure, in successive stages of the complaint; and in epidemics presenting somewhat different characters; the changes thus arising obviously requiring a modified treatment. The means, however, which I have here suggested, or camphor, opium, and the alkaline subcarbonates, seem most deserving of confidence in this variety, particularly if aided by frictions, warm stimulating fomentations, and the warm bath, the alkaline carbonates or common salt having been dissolved in the water. The patient's strength should be supported by light, nourishing, and wholesome food.

66. *b*. The gangrene produced by *animal substances*, in a state of disease or of decay, should be treated very nearly as recommended in the articles on *Diffusive Inflammation of the* Cellular Tissue, and on the adynamic state of Erysipelas. The therapeutical indications are the same, namely, to excite and support vital power, and to allay irritability, and thereby to prevent the extension of disorganisation, by enabling the vessels to form coagulable lymph. With these intentions, combinations of tonics, antiseptics, and anodynes are resorted to, especially after morbid secretions have been evacuated by stomachic purgatives, and by enemata; and camphor, capsicum, and the acetate of morphia are prescribed, when nervous excitement or vascular irritability are very prominent. Ammonia, musk, chlorate of potash, sulphate of quinine, and warm aromatics, or spices, are generally beneficial; and may be given in various forms of combination, and in conjunction with opiates, according to the peculiarities of the case.

67. *c. Hospital gangrene* is the most common variety, and therefore the most important, of this species of disorganisation: in none has a greater difference of opinion existed as to the most appropriate method of cure. It is obvious that a *prophylactic* and *curative* treatment should be based only upon a correct idea of the causes, in the various circumstances in which this formidable malady presents itself. These causes are — 1st. A cachectic and debilitated state of constitution, generally connected with disorder of the digestive canal and liver; — 2d. A low, humid, and miasmatous atmosphere, and a damp, and an ill-ventilated place of residence; — 3d. Insufficient or unwholesome food, and the use of impure water. — 4th. An air loaded with putrid miasms or animal exhalations, as that of crowded hospitals, camps, ships and transports; — and, 5th. The contact of animal matter or of diseased secretions or discharges, as in using unclean sponges, &c. From what I have seen of the disease, in foreign hospitals, soon after the last war, I infer, that, although the fourth and fifth of these are the most common exciting causes, the others are often more or less influential, either in predisposing to it, or in directly producing it, especially after severe injuries and operations, or when aided by the depressing passions; and that the causes commonly giving rise to typhoid or putro-adynamic fever will often occasion it, especially in crowded surgical wards of hospitals.

68. *a*. The opinion of Delpech as to the origin of this form of gangrene, which is very nearly the same with that which I have now advanced, has been called an "irrational conjecture, quite destitute of truth," by Mr. S. Cooper. M. Delpech's views are derived from extensive and diversified observation, in both civil and military hospitals, and are neither irrational nor destitute of truth. It surely is not becoming to condemn with harsh censure what cannot be answered by sound argument. Many of the surgical writers upon this malady have hardly looked beyond the local origin of it; and have limited their curative measures too strictly to the gangrened part. Others have, with greater justice, relied on constitutional treatment, without, however, neglecting such local means as have been found serviceable. The utmost diversity of opinion also exists as to what internal and external remedies are most beneficial. The very inefficient and inappropriate medicines but too often used internally by surgeons in this disease, have proved a principal cause of their distrust of this method of cure; for whenever the expected result did not follow from the means employed, the cause of failure was not attributed to such means, but to the nature of the malady. It is a matter of astonishment that, with all the reverence with which the doctrines and practice of John Hunter have been viewed, the most important of both have been very generally neglected, in the treatment of this and other external lesions connected with constitutional disorder. This able man stated, as axioms in pathology, that a certain degree of vital tone or energy is requisite for the formation of coagulable lymph, by which the spreading of inflammation and sphacelation will be prevented; that where, owing to deficiency of vital energy, vascular action is incompetent to the formation of coagulable lymph, these lesions will extend, and the morbid fluids will contaminate the surrounding tissues; and that, in order to avoid these consequences, means should be used to increase the vital power of the vessels in the diseased part, and thereby to enable them to form coagulable lymph, by which disorganisation will be arrested. Although the

state of the circulating fluid is overlooked in these views, yet they are correct in the main, and form the basis of a rational and successful practice in this and several other maladies.

69. *β*. Before I proceed succinctly to state the practice I would recommend conformably with these opinions, and with the results of observation. I shall briefly notice the constitutional means advised for this disease by some experienced writers. On the first manifestation of hospital gangrene, *emetics* are recommended by Pouteau, Dussaussoy, Briggs, Thomson, and Hennen, and are evidently of service, at this period, when there are signs of biliary derangement. — *Bloodletting* is considered injurious or productive of little benefit by Blackadder, Thomson, and Boggie, whilst Dr. Hennen and Mr. Welbank consider that moderate depletion is serviceable early in the attack, and in strong plethoric persons; and that the risk of the disease attacking the lancet-wound may be prevented by accurate closure, and by allowing the bandage to remain undisturbed until the cicatrix is completely formed. — *Purgatives* are directed by Dr. Boggie and other writers, but they should be warm and stomachic, or conjoined with tonics, stimulants, or aromatics, and exhibited early in the disease. It is chiefly after morbid secretions have been evacuated by the early exhibition of emetics and purgatives, that advantage from tonics and stimulants will be most apparent; and it is probably from an insufficient attention having been paid to this circumstance, that so much difference of opinion exists as to the propriety of using these latter remedies.

70. *Cinchona* alone, or in various states of combination, is praised for its good effects in this disease by Boyer, and numerous experienced writers, whilst Hennen and Welbank considers that it is injurious. It is recommended in conjunction with the alkaline subcarbonates by Van Wy, and Saviard; and with camphor, by Flajani. — *Camphor* is much used in this form of gangrene by Continental practitioners. Pouteau, Conradi, Wenzel, and Ontyd prescribe it in large doses. I have seen much advantage derived from it; but I prefer to give it in the forms of combination to be mentioned hereafter. — The *arsenical solution* is directed by Otto. It may be employed in similar states of constitution, to those in which cinchona or sulphate of quinine may be prescribed. — *Arnica, cascarilla,* and various other stimulants and aromatics are recommended by various authors, but they are useful merely as adjuvants of other more active means. — *Acids* are noticed in favourable terms by Mr. S. Cooper, and several other writers; but I have much doubt of any benefit being derived from their internal use. The *hydrochloric* and *nitric acids*, or a combination of both, promise most advantages of this class of medicines. — Of the propriety of exhibiting *opiates* there can be no doubt; and most writers agree on this point, and differ only as to the period of having recourse to them. Dr. Thomson prefers them in the form of Dover's powder.

71. *γ*. From observation of the results of different modes of practice in hospital gangrene, rather than from my own active experience, I would advise the adoption of a practice consonant with the views stated above. Having evacuated morbid secretions and fæcal accumulations by emetics aud warm stomachic purgatives, and directed a small or moderate bloodletting, in such cases only as are attended by excessive action and signs of plethora, I would advise the decoction of bark or the sulphate of quinine, in modes of combination appropriate to the peculiarities of the case. If vascular action continue very much excited, the decoction of bark may be conjoined with the nitrate of potash, the solution of the acetate of ammonia, and the spirits of nitric ether, or with the muriate of ammonia and chloric ether. When vascular action presents diminished tone, the sulphate of quinine may be exhibited in the compound infusion of roses; or in the form of pill with camphor. Where the pulse is weak and quick, the evacuations offensive, and the disposition of the gangrene to extend very evident, the decoction of bark should be combined with the chlorate of potash, and compound tincture of bark; and if anxiety, pain, or irritability be present, the tincture of opium or the muriate of morphia may be added. The great frequency of pulse, and loaded state of the tongue, generally observed in hospital gangrene, even indicate the propriety of having recourse to these and similar remedies, or to wine, in some cases. Regard should also be paid to the previous habits of the patient; and persons addicted to spirituous liquors may be allowed them, but in duely prescribed quantities. If the stomach become irritable, the treatment I have advised above (§ 60.) may be employed, or spiced wine may be given; or soda water, spruce or ginger beer, or Seltzer water, may severally be made vehicles of tonic, stimulant, cardiac, or aromatic substances.

72. If diarrhœa appear, and threaten to exhaust the powers of the constitution, opium, or the compound tincture of camphor, should be given in full doses, with the tonic and antiseptic remedies already mentioned; or the chloride of lime may be used internally with tonics and aromatics, or with camphor, and the warm spices, or administered in mucilaginous and emollient enemata. If delirium supervene, exhaustion of nervous power, with or without deterioration of the circulating fluids, may be inferred to exist; and camphor with opium, or henbane, the decoction of bark, with the alkaline subcarbonates and tincture of serpentaria, wine, and the other remedies recommended for *Putro-adynamic* Fever, and the low forms of Delirium (see these articles), should be prescribed with a decision commensurate with the urgency of the case. Camphor, in order to be beneficial in hospital gangrene, ought to be taken either in frequent, or in large doses. If vascular action be much excited, it will be advantageously conjoined with the nitrate of potash, or nitrate of soda, or the alkaline subcarbonates, or other saline refrigerants. If vascular action be weak or impaired, and vital power manifestly reduced, it should be combined with the preparations of cinchona, or of serpentaria, or with the chlorides and aromatics. Cascarilla, cinchona, or arnica may be severally employed, in similar forms of combination, appropriately to the circumstances of the case.

73. In this form of gangrene especially, prophylactic measures founded upon a knowledge of the causes specified above (§ 38.) should be strictly enforced; and, as soon as the disease manifests itself, the patient should be removed into a well ventilated and dry apartment, and the

mind encouraged by cheering prospects, and by the confidence of the physician in the extent of his resources. The local treatment ought to proceed, as will hereafter be noticed, conjointly with the above constitutional means of cure.

74. *d.* When gangrene follows the *bites of serpents,* the viper, or other reptiles, the constitutional symptoms will then be characterised by depression of vital action and power so extreme as to threaten immediate dissolution, and to require the exhibition of ammonia, camphor, capsicum, and other energetic stimulants in large and frequent doses. In cases of this description, recourse should be had to local means (§ 78.) immediately upon the receipt of injury.

75. ii. *Local Treatment.* — *a.* Topical measures ought to be directed with the following intentions; namely — 1st. To restore the tone of the extreme vessels in, or surrounding, the gangrened or sphacelated part; — 2d. To procure the separation of this part as soon as it passes into sphacelation; — and, 3d. To prevent the contamination of the circulation and surrounding tissues by the morbid matters proceeding from its decomposition. Substances calculated to accomplish either of these ends, will generally also attain the others. Their application should, however, not be delayed either until the gangrened part pass into sphacelation, or after this result has taken place, but should be brought in aid of constitutional treatment. Before the discovery of the chlorides, and kréosote, numerous substances were recommended to arrest the progress of gangrene, and to fulfil the intentions just stated. In cases of internal gangrene, measures of this description can but rarely be employed. In gangrene of the lungs, however, the inhalation of the fumes of kréosote, or of the chlorides, or dilute chlorine, has proved of more or less service. A judicious use of these in external sphacelus is frequently productive of decided benefit, as they fulfil all the above indications. Next to them in efficacy, are the turpentines, and the balsams, especially the spirits of turpentine, and the Peruvian balsam. When there are much pain and irritability of the part, opium may be added to the local applications. Many other substances have been recommended to be used topically in gangrene, but I must refer to the well-known work of Mr. S. Cooper for a sufficiently detailed account of them. A glance at the opinions of surgical writers on gangrene will readily show that each has been sufficiently disposed to enhance his own favourite application by depreciating those recommended by others, so that the inexperienced practitioner is bewildered amidst contradictory evidence on the subject. The substances already mentioned, especially Labarraque's fluid, strong solutions of the chlorides, or of kréosote, or of pyroligneous acid conjoined with kréosote, and spirits of turpentine, with or without this latter, are the most generally applicable. They may be used in the form of wash or lotion, or on the surface of any of the several kinds of poultices commonly prescribed.

76. *b.* In gangrene from *animal poisons,* the local treatment need not differ materially from that now advised. In this variety, as well as in others, different means have been recommended. The application of arsenic has been directed for *phagedenic gangrene,* by Fabricius Hildanus and Zinke; the actual cautery, by Celsus, Michel, Loefler, Murray, and others; powdered bark, with turpentine, by Knackstedt; these latter substances conjoined with the muriate of ammonia, by Dussassoy; the subcarbonate of iron, by Brandis; charcoal, by Marcus, Beddoes, and Bornemann; the pyroligneous acid by Simons; and a strong mixture of camphor in thick mucilage, spread over the part, by Schneider. In this form of gangrene, more, perhaps, than in any other, it is important completely to exclude the external air from the diseased surface, at the same time that the intentions with which external remedies are employed, should be strictly observed. Therefore, whilst the morbid secretions of the part should be prevented from accumulating, or be corrected by the antiseptics already mentioned, the access of air ought to be excluded by means best calculated to fulfil this end, and to be also the vehicles of antiseptic and stimulating remedies. A thick mucilage may, perhaps, be as advantageously used in this way as any other substance. But this intention is important not only in a curative, but also in a prophylactic, point of view. It is observed by nature in all external sores presenting a disposition to heal. When an eschar can be formed by any application, the end here kept in view may be accomplished by it. Indeed, the substances frequently resorted to in the present day, particularly the nitrate of silver, the actual cautery, and the stronger acids, as the nitric or muriatic, are beneficial by their operation in this manner, as much as by the stimulus they impart to the diseased surface.

77. *c.* The *hemorrhage* that often takes place upon the separation of the sloughs in phagedenic or hospital gangrene, may be arrested either by the means just mentioned, or by the application of the spirits of turpentine containing kréosote, or of strong pyroligneous acid with the superacetate of lead, or of a concentrated solution of the chloride of lime, or of any of the strong metallic salts.

78. *d.* In cases of the bites of poisonous reptiles, or even of the inoculation of virulent or morbid matter, the application of cupping glasses, or of other instruments by which the air may be exhausted over the seat of injury, was recommended by Celsus, and in modern times by Sir David Barry. The ancients, especially the Egyptians, resorted to suction for the removal of these and other poisons, when introduced by bites or wounds; and the practice is general even in the present day, in uncivilised countries; the fact having been well known to them, that the individual administering this sort of aid, will not himself be injured, if no abrasion exist on his tongue or lips. The common procedure in these countries, is immediately to place a ligature above the part where the poison has been inserted, when this can possibly be done, and next to have recourse to suction for its removal. I have seen this practice resorted to on two or three occasions, with success. When, however, it has been too long delayed, or cannot be adopted, ammonia, spirits of turpentine, and various stimulating substances may be applied to the part, as advised in the article Poisons. If gangrene have taken place, the local remedies noticed above, are the most appropriate.

79. iii. The *Diet* and *Regimen* in gangrene must necessarily be regulated according to the peculiarities of the case; but, in general, a mild, spare, and

digestible diet only should be prescribed. If the patient enjoy not a pure and dry air, he should, if possible be removed to a situation possessing this advantage. His mind should be encouraged, and his confidence insured, by the attention of his attendants, and the bearing of his physician.

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GASTRODYNEA. See article Stomach — *Altered Sensibility of.*

GASTRO-ENTERIC DISEASE. — Syn. *Gastro-enteritis. Gastro-entérite*, Broussais.

Classif. — General Pathology.

1. The diseases of the stomach and intestines are treated of in separate articles. But not infrequently both the stomach and intestines are more or less affected at the same time by inflammatory irritation or action, either primarily, or consecutively of other diseases, although not in the same manner, or in the same degree. — Inflammatory disorder coexisting in the stomach and intestines, although not so common, as M. Broussais has contended, is certainly very frequently observed, especially in connection with other complaints. Even when appearing as the consecutive ailment, its importance is often so great as to require attention to be directed chiefly to it in forming

the intentions, as well as in selecting the means, of cure.

2. Of the modern writers on Medicine, none has entertained juster views on the subject of gastro-enteric disorder, than Dr. W. STOKES, who has remarked that the pathology of the digestive canal has been but imperfectly understood in these countries, and that consequently a mode of practice productive of injury to human life has been too generally adopted. Several causes have conduced to this: —1st. The importance that has been long attached to disorders of the liver; — 2d. The empirical or routine practice, introduced by the writings of HAMILTON and ABERNETHY; — and, 3d. The distrust with which the doctrines of BROUSSAIS have been viewed, owing to the unwarranted generalisations of which they in a great measure consist. If the school of BROUSSAIS have thus gone too far in attributing importance to gastro-enteric disorder, the writers and practitioners in this country have erred as remarkably, in overlooking it almost entirely. When we consider the connections of the digestive mucous surface, with the rest of the organisation, by means of that system of nerves which chiefly supplies it, and the important functions which this surface performs, we may infer that irritations, or inflammatory excitement, commencing in this quarter, will often be reflected on distant, but related organs. In childhood, and in early life, whilst the susceptibility of the system is at its maximum, the disorders consequent upon gastro-enteric irritation are diversified, of frequent occurrence, and often serious; and at later epochs of existence, although they may not be so obvious, nor so common, yet they are occasionally attended by danger. It becomes, therefore, a matter of extreme importance in medical practice, to trace the connection, the priority, and the procession, of morbid action in those parts of the system which are most intimately related to the digestive canal. The practitioner will find, on numerous occasions, disorder of this part associated with that of the cerebro-spinal nervous system, of the respiratory organs, of the heart, of the liver, or of the skin; and, although the affection of the digestive canal will sometimes be consequent upon, or coëtaneous with, either of these related disorders, yet a different order of succession will be much more frequently observed.

3. I. *Connection of Gastro-enteric Irritation or Inflammation, with Affections of the Cerebro-spinal Axis.*—Affections of the brain and spinal cord are often complicated with disorder of the digestive canal. In many cases, the latter is merely functional, and depends entirely upon the intensity and extent of the former; but much more frequently, the affection of the brain is induced by irritation of the gastro-enteric surface. In children, this latter occurrence is remarkably common; and even in adults, a slight degree of disorder of the stomach is often followed by headach, somnolency, and incapability of mental exertion. The occasional dependence of epilepsy in adults, and of convulsions in children, upon morbid action in the digestive canal, is fully shown in the articles upon these diseases. Inflammation of the membranes, or of the substance of the brain, and acute hydrocephalus, sometimes also supervene upon gastro-intestinal irritation; and, in the course of their development, render obscure, or entirely mask, the primary ailment; for, as LALLEMAND has remarked, as soon as the cerebral affection mounts to such a pitch, as even partially to obscure sensibility, the existence of disorder in the digestive canal is ascertained with great difficulty. I believe that the majority of cases of the affection, recently denominated spinal irritation, are caused by gastro-enteric disorder; chronic irritation in this latter situation being propagated to the spinal cord through the medium of the ganglial nerves communicating with the roots of the spinal nerves. It is of great importance to keep these pathological states in recollection, and to ascertain as far as may be their priority; for when affections seated in the cerebro-spinal axis are consequent upon gastro-intestinal irritation, a treatment directed for the removal of the former without reference to the nature of the latter, may, especially if it be of an exciting nature, aggravate and perpetuate the mischief.

4. This principle has been carried to an extreme length by M. BROUSSAIS, who has proscribed the use of purgatives even in the more dangerous affections of the brain, from the mistaken idea that purgatives will necessarily increase the already existing irritation of the digestive canal, of which he supposes the cerebral disease to be almost always a consequence. This doctrine comprises two assumptions: — 1st. That the affection of the brain necessarily depends upon pre-existent irritation of the digestive canal; — and, 2d. That the exhibition of purgatives will increase this irritation, and thereby aggravate the cerebral disease. As to the first of these, it may be answered, with perfect truth, that the procession of morbid action he contends for, is only occasional or contingent upon concurrent circumstances: and, as respects the second, the converse of the proposition is probably the more correct; for a judicious exhibition of purgatives will frequently remove irritation of the digestive canal, especially if it be caused by unwholesome ingesta, or morbid secretions, or fæcal accumulations; and, even when it cannot be referred to either of these, but rather to the state of vascular action in the digestive surface, the augmented secretion procured by refrigerant or mild purgatives may promote its resolution, or diminish its intensity.

5. II. *Connection of Gastro-intestinal Irritation with Disease of the Respiratory Organs.* — *a.* The association of gastro-enteric irritation with most of the complaints observed in the respiratory organs, is of greater frequency than is generally supposed. Diseases being so universally described by writers and teachers as species of unvarying form, and without sufficient reference to diversity of character and complication, their more important connections and associations with other maladies are completely neglected, and are unknown to the young practitioner until obtruded upon him in practice. The complication of *bronchitis, catarrh*, and other affections of the respiratory organs with gastro-enteric irritation, has been noticed when treating of these disorders. With respect, therefore, to these, I have only now to remark, that I have seen both forms of disorder follow coëtaneously upon the exciting cause, and that the prior existence of the gastric disorder has often predisposed to the bronchial or pulmonary disease, a very slight exciting cause being suffi-

cient to produce the latter, when the former is present.

6. *b.* During a number of years, I had almost daily occasion, at the Infirmary for Children, to enter against the names of some of the patients, *gastro-catarrhal fever*, or *gastro-bronchitic irritation* or *inflammation*, according to the features of the case, as the names of the affections for which they were admitted. In these, it was difficult, if not impossible, to determine which was the primary disorder; but it was always evident that the complication was attended by much danger, the more especially as it occurred chiefly in debilitated or delicate children, and extended to the bronchi of both lungs. In many instances, the affection of the mucous membrane appeared to be universal, and the progress to a fatal issue was very rapid. Gastro-enteric irritation, although it can scarcely be considered as a cause of *tubercular consumption*, unless when it has continued long, is a very frequent concomitant of the early, as well as of the advanced stages of this malady. I have often observed that, when the former has been aggravated by improper diet or treatment, the latter has also been exasperated. (See TUBERCULAR CONSUMPTION.)

7. *c.* Even the occurrence of *pneumonia* may be favoured by disorder of the digestive canal; and, in this case, the pneumonia may assume a nervous or low character, constituting the *Pneumonia nervosa* of the older writers. The association of disorder of the digestive mucous surface with affections of the respiratory organs, although more generally neglected than might have been expected from the state of science at the present day, has long attracted some attention, as evinced by the notices taken of it by the older and modern writers, by the names *Stomach-cough*, *Verminous Cough*, and *Dyspeptic Phthisis*. In *hooping cough*, it is often difficult to decide whether the digestive or the respiratory mucous surface be the most affected: the vomiting in which paroxysms of cough terminate in various affections of the chest, is perhaps as much owing to attendant gastric irritation, as to the convulsive action of the respiratory organs. In all cases, therefore, in which we have reason to dread the origin or association of pulmonary, or cerebral disease, with gastro-intestinal irritation, inquiries ought to be made for the symptoms by which this latter is indicated. When pain, tenderness, or tension at the epigastrium, or in the abdomen, are present; and particularly if the pain be increased on pressure, or be attended by nausea, flatulency, or acrid eructations, or occasional vomiting, and an irregular state of the bowels, the existence of gastro-enteric inflammation should be inferred, and the treatment ought to be directed to its removal. The means of cure, also, required for the pulmonary complication should be so devised as not to increase, if they may not diminish, the gastric irritation. The diet of the patient ought to be prescribed with similar intentions. When pulmonary affections are thus complicated, the treatment of them by means of tartarised antimony is frequently injurious, particularly in children, as tending both to aggravate the gastric disorder, and the nervous depression often attendant upon them. Even when pneumonia is thus associated, the tartar emetic may be dispensed with; and, as Dr. W. STOKES justly advises, the strength of the patient must be supported by a farinaceous food, jellies, and broths, even whilst local depletions, and external derivatives, are being employed. The connection of gastro-enteric irritation with tubercular consumption is one of the most important topics in practical medicine, and one which has been imperfectly understood, and, with a very few exceptions, overlooked, by writers in this country. As the subject, however, belongs especially to this disease, in its practical bearings, it is considered under that head.

8. III. *Gastro-enteric Irritation* often induces severe *disorder of the vascular system.* — This, perhaps, is the most common occurrence met with in practice. The febrile disturbances consequent upon irritating ingesta are so frequent, and so generally admitted, as hardly to require notice. Amongst children, they are constantly appearing, and almost as constantly are removed by means appropriate to the cause of irritation. If this be indigestible substances, an emetic, or purgative, will be the most efficacious, and by no means the most unsafe, treatment that can be adopted, notwithstanding the horror entertained by BROUSSAIS and his followers of these medicines. In such cases, the disorder subsides on the removal of its cause; but when it is induced by the inordinate use of stimuli, or by other causes that have either ceased to act, or admit not of so ready a removal, it will be better to leave the case to nature, than prescribe this treatment. In these circumstances, *refrigerants*, cooling *diaphoretics*, and mild *sedatives* with *emollients*, are the most appropriate. The nitrate of potash, or the nitrate of soda, the alkaline subcarbonates, the muriate of ammonia in small doses, sulphate of potash, and ipecacuanha, are severally of use, particularly in mucilaginous or emollient vehicles; but the bowels should be kept freely open by mild, oleaginous, or refrigerant purgatives.

9. I have already insisted upon the fact, that purgatives or laxatives, when judiciously selected, will rather diminish than increase gastro-enteric irritation. Some doubts may exist as to the operation of calomel in this way; but an extensive and diversified experience of this substance, and the experiments performed with it by Mr. ANNESLEY, have convinced me that in full doses it diminishes irritation and inflammation in the stomach and small intestines, whilst it increases, or even excites, these morbid states in the large bowels, and depresses nervous power, or augments the general susceptibility and irritability of the frame, especially if frequently exhibited, or continued for a considerable time.

10. IV. The *Connection of Gastro-enteric Disorder with Fevers*, is sufficiently illustrated in the articles on these diseases. It has formed the basis of M. BROUSSAIS' pathology of fever. Little, therefore, need be added at this place respecting it. The fact, however, must be admitted, that gastro-enteric inflammation, in more or less manifest grades, is one of the most prominent and constant phenomena of the invasion of exanthematous fevers; and that a somewhat similar state of vascular injection, or irritation, exists at this period in the stomach, and upper portions of the intestinal canal, to that which subsequently appears on the cutaneous surface:

the former, however, subsiding as the latter becomes developed. This is satisfactorily proved by the character of the symptoms, more particularly by the nausea, vomiting, epigastric tenderness, redness of the fauces, and edges of the tongue, &c. A somewhat similar condition most probably exists in the early stages of typhus and other fevers; but it is in the advanced periods of these, that the gastro-intestinal surface becomes most prominently affected. In exanthematous fevers also, particularly in delicate and cachectic subjects, or when the eruption has not been fully evolved, or has been delayed or suppressed, or has prematurely disappeared, the gastro-enteric disorder not infrequently is the most serious part of the disease, in respect both of the lesions in which it is prone rapidly to terminate, and of the cerebral affection, which it occasionally superinduces. It must not, however, be supposed from this statement, that I consider gastro-enteric irritation, or inflammation, to be the proximate cause or primary pathological condition of fevers. I merely contend that it is often one of the most prominent and important of the several lesions observed in their early stages, but is produced by changes still earlier in the chain of morbid causation.

11. There can be no doubt of the fact, insisted upon by BROUSSAIS and other French pathologists, that erythema, or inflammatory injection of the gastro-intestinal mucous surface, is a very general phenomenon in fevers, and that it may, and very often does, exist without pain, or even tenderness on pressure; but, however intense and prominent it may appear amid the various lesions characterising these maladies, it is certainly not the cause of the changes and symptoms attributed to it by these writers. Inflammatory irritation of this part, as severe as that observed in any form of fever, may exist without fever at all, and still more without the extreme prostration, which they believe it to occasion. The intestinal mucous surface suffers merely in common with all other tissues of the body in the progress of essential fever; but it is much more obnoxious to alterations than any other part, owing to the nature of its organisation, to its relations with other viscera, and to the numerous and diversified causes of irritation to which it is constantly exposed, particularly the morbid secretions, and the incongruous and exciting substances, continually passing over it.

12. V. *Connection of Gastro-enteric Irritation with Hepatic Disorder, &c.* — *a.* I have insisted, in the article DUODENUM, on the importance of attending to disorders of the upper portion of the intestinal canal, and of distinguishing between them and the affections of the biliary organs. Disorders of the stomach extending to the duodenum and jejunum, or even further, have been often treated in this country for diseases of the liver; and it must be admitted that the difficulty of forming a diagnosis between them is great. But the disorders of these portions of the alimentary canal, which are thus liable to be mistaken, are not so uniformly inflammatory as Dr. W. STOKES appears to believe, in his very acute observations on this subject; or, if they be, the inflammation is greatly modified by its connection with nervous asthenia, or other morbid states. — When, however, gastro-enteritis is really present, two great evils result, as this able physician has remarked, from mistaking it for affections of the liver; — one, the neglect of the actual disease; the other, its exasperation by means supposed capable of removing the hepatic disorder. The consequence is, that the gastro-enteric irritation, being increased by the inappropriate treatment adopted, extends along the ducts, or by nervous and vascular connection, to the biliary apparatus; and thus the disease, which was in the first instance incorrectly supposed to exist, is actually superinduced by the means erroneously resorted to for its removal. M. BROUSSAIS has insisted upon inflammations of the liver being always consecutive of gastro-enteric inflammation. This, however, is one of the several generalisations at which he has arrived from insufficient data. But, until he wrote, the fact that irritation of the digestive canal, allowed long to exist, or to go on to inflammatory action, frequently induces chronic hepatitis, was entirely overlooked. There can be no doubt that prolonged and frequently repeated over-excitement of the digestive canal, by a too rich, stimulating, or full diet, or by spirituous or fermented liquors, is often followed by hepatic disease; but, as shown in the article LIVER, other causes, besides gastro-enteritis, are concerned in producing it. One of the most common circumstances in the production, or exasperation, of intestinal irritation, and of the ultimate supervention of chronic hepatitis, is the improper or too frequent use of acrid purgatives, — a practice to which I have traced a number of the cases of hepatic disorders which I have seen in a warm climate, and more recently in this country, particularly among persons who have returned from the East Indies, or from other places within the tropics.

13. The occurrence of disease of the liver, and even of abscess of it, consecutively upon chronic diarrhœa, and dysentery, has long attracted the attention of most practitioners in warm climates. In many of such cases, although there may have been reason to suppose, that the hepatic disorder preceded, or even caused, the intestinal affection, there can be no doubt that the persistence of this latter, or the exasperation of it, by a purgative treatment, has rendered the former more acute and manifest. Some difference of opinion exists as to the mode in which the gastro-enteric disorder is propagated to the biliary organs. Some suppose that the excitement is sympathetically extended to them, this extension being favoured by the associated functions of these different organs. Others believe that the inflammation has spread from the mucous surface of the duodenum to that of the biliary ducts. Instances have been adduced by ANDRAL, RIBES, BOUILLAUD, and REYNAUD, which favour the inference that inflammation commences in the radicles of the mesenteric veins, and extends along the vena porta, and its ramifications in the liver. This, however, must be a circumstance only of occasional or rare occurrence. I have, however, long since supposed that the more acute attacks of inflammation of the substance of the liver, and the purulent collections frequently formed in it, in the course of chronic dysentery, have been superinduced in this manner. — Upon the whole, it may be inferred, that in complications of gastro-enteric with biliary disorder, either lesion may have been primary. But

that in this climate, especially, the gastro-enteric more frequently precedes than follows the hepatic affection. In warm climates, the converse of this probably obtains, although not to the extent very generally believed by many practitioners who have written on intertropical diseases.

14. *b.* That disease of the *mesenteric glands* is generally induced by the frequent recurrence or persistence of gastro-enteric irritation and inflammation, often connected, however, with various other elements of disorder, is sufficiently evident, and now very generally admitted. And yet I have seen, especially at an early period of my practice, this malady treated by purgatives, sometimes of a very acrid nature. The enlargement and obstruction of these glands, depending chiefly on the affection of the digestive mucous surface, can be remedied only by the previous removal of this affection, and by the prevention of its recurrence. When this end is obtained by local depletions; by refrigerants conjoined with the alkaline subcarbonates, ipecacuanha, and demulcents; and by suitable diet and regimen; the consecutive disease of the glands often gradually disappears.

15. VI. *The Connection of Gastro-enteric Inflammation with Diseases of the Skin*, is much more general than practitioners in this country suppose. It is chiefly owing to the irritation of the digestive mucous surface in various grades of severity, that the cutaneous affection resists so long the treatment prescribed for its removal. I have repeatedly seen cases of eczema, and of other obstinate diseases of the skin complicated with the slighter and more chronic grades of gastro-enteritis, the latter being even so prominent as to be indicated by epigastric pain and tenderness; yet arsenical, or other irritating medicines, were exhibited in no small quantities; and, although they were evidently exasperating both the internal and external affections, they were continued with a perfect belief of their applicability. Upon the adoption, in these cases, of general or local depletions, of refrigerant medicines, of warm and medicated baths, and of a light and appropriate diet, all disorder has soon after disappeared. The chief reasons of diseases of the skin proving so obstinate, are — 1st. This form of complication; — 2d. The inflammatory diathesis and vascular plethora characterising them; — 3d. The neglect of these pathological associations, and the adoption in consequence of inappropriate means of cure; — 4th. Inattention to diet and regimen, particularly as respects the use of animal food, and stimulating beverages and articles of diet; — and 5th. An insufficient observation of the states of assimulation and excretion, with the view of perfecting the former, and of promoting the latter.

16. VII. *Chronic Gastro-enteritis is often associated with Affections of the Genito-urinary Organs, and with Gout.* — We sometimes observe leucorrhœa and other uterine disorders connected with gastric irritation; the former most frequently being induced, or favoured in its occurrence, by the latter. Difficult or scanty menstruation is occasionally traced to the same cause. In these cases, the means calculated to relieve the disorder of the digestive mucous surface, are generally most efficacious for removing the sympathetic affection. A similar association of the disorders of the digestive and urinary passages is sometimes also observed; but it is unnecessary to do more than to refer to it. How far gastro-enteric irritation may influence the states of urinary excretion, has never been so fully illustrated as is to be desired. What we know of the subject is derived from the researches of Dr. Prout; and it is to be hoped that this scientific physician will proceed in his investigations into it. There can be no doubt that a state of chronic irritation, or of inflammatory erethism, of the digestive mucous surface, will so impede the functions of digestion and assimilation, as to cause a superabundance of materials in the blood, calculated to excite or to disorder the actions of the kidneys, and requiring to be eliminated from the circulation. When this disorder of the gastro-enteric surface is attended, as it not infrequently is, with a craving or morbidly excited appetite, food is taken in larger quantity than it can be digested; and much imperfectly formed chyle is carried into the blood, where it excites disorder of the liver, of the kidneys, and of the skin, in the course of the excretion of the unassimilated matters by these organs. — To this source may be traced, in many instances, not only the morbid conditions of the urine, and of the kidneys themselves, but also the production of an attack of *Gout*, in a regular or irregular form.

17. The *therapeutical indications*, and even the *means of cure*, for these various gastro-enteric complications, may be readily inferred from what has been stated above. — More precise information will, however, be obtained as to these topics, and as to the *causes* of the gastro-enteric disorder, by referring to the articles Gout, Indigestion, Intestines, Stomach, &c.

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GLANDERS.

Classif. — III. Class, III. Order (*Author*, see *Classif.* in *Preface*).

1. Defin. — *Vascular injection, and chancry sores of the membrane of the nose, frontal sinus, and parts adjoining, with a profuse offensive discharge, and pustular eruptions, or tubercular and gangrenous ulcers in various parts, preceded by constitutional disorder, attended by fever of a low or malignant character, and produced by contagion.*

2. Glanders until lately was considered exclu-

sively to belong to the horse, the ass, and the mule. Within these few years, several cases have occurred, showing that it may be communicated to man, in either the acute or chronic form. About twelve years ago, in the course of a discussion at the Medico-Chirurgical Society, I stated, that the fact of the disease having been thus communicated, had been proved by cases that had occurred in Germany. The cases to which I then alluded were published in *Rust's Magazine*, for 1821. Since then, cases have been observed in this country, and published by Mr. TRAVERS, Mr. BROWN, and Dr. ELLIOTSON. It is to this last gentleman, however, that we are most indebted for a full elucidation of the subject, by his able researches. The frequency of the occurrence of the disease in the human subject justifies the notice that will be taken of it in this work.

3. *Acute* and *chronic glanders* are contagious amongst the animals just mentioned; but from the facts adduced by Mr. COLEMAN, Dr. ASHBURNER, and Dr. ELLIOTSON, it evidently appears that the disease may be generated anew, when horses are shut up in a confined space for a long time, as on board transports. The characteristic symptoms of the disease in its acute form in the horse, are — intense inflammation of the pituitary membrane, attended by erosions which soon pass into chancre-like sores; swelling of the lips and nose; rapid extension of the ulceration, giving rise to a purulent and disagreeable discharge, which often passes to a purplish, or bloody, and horribly fœtid sanies; subsequently, gangrene of the nasal membrane, with increased discharge, sometimes with slight hæmorrhage; swelling and pain of the sublingual glands; inflammation of the conjunctiva and nasal eyelid, quickly passing into a livid and swollen state, with an offensive sanious discharge; and fever of a putro-adynamic or malignant character. As the local changes extend to the adjoining parts, respiration becomes laborious, and the superficial vessels congested, the animal dying in a few days, or after a longer or shorter interval. If the disease is protracted, the symptoms sometimes relax, but the state of the pituitary membrane, and the character of the discharge, show that it has degenerated into a chronic form. Pustules may also appear in the progress of glanders, with gangrene of the external parts of the face, and tumours with swelling of the extremities, the disease being thus associated with farcy, which is a modification of it.

4. The *farcy glanders* generally appear in the form of small tumours about the legs, lips, face, neck, or other parts of the body: these tumours vary in size, and in the rapidity of their progress to ulceration. They sometimes create little inconvenience, particularly in a chronic state; but at other times, they are large, painful, numerous, and rapid in their course. They are at first hard; soon become soft, burst, and degenerate into foul ulcers, with abrupt edges, and of a pale glossy appearance. Lines of communication are generally observed between these tumours or ulcers, particularly when seated on the insides of the limbs: these lines are inflamed and enlarged absorbents.

5. I. DESCRIPTION OF GLANDERS IN THE HUMAN SUBJECT. — Dr. ELLIOTSON remarks that glanders may appear in the human subject in different forms. — 1st. In that of *simple acute glanders;* the disease attacking the nasal cavities and adjoining parts. 2d. In that of *acute farcy glanders;* the malady appearing in various parts, in the form of small tumours, giving rise to foul ulcers, suppuration, &c. 3d. These varieties may exist separately, or they may be both produced at the same time, or the one may precede the other. 4th. Each of them may also occur in a *chronic form,* and, in this form, also, may exist separately, or be conjoined. That the acute true glanders, and the farcy glanders, are the same disease, is proved by the fact, that the matter deposited in the tumours characterising the latter, or that coming from the nostrils in the former, gives rise to either of these varieties, or to them both conjoined; or, in other words, that simple acute glanders may proceed from the matter of farcy, or from its own discharge, and that farcy glanders may arise from the discharge from the nostrils in simple acute glanders.

6. i. *Simple Acute Glanders* appears to commence with rigors, headach, irritability of stomach, depression of spirits, prostration of strength, stiffness and severe constant pain of the joints, aggravated on motion, and great thirst. The patient, moreover, complains of much beat about the nasal organ and windpipe, accompanied with a copious viscid discharge. The nose and surrounding parts become swollen, hot, excoriated, and of a bright red or livid colour; one or both eyes are inflamed, or completely closed; a profuse tenacious mucus, at first of a deep yellow, but afterwards of a bloody or dark sanious appearance, exudes from one or both nostrils, sometimes also from the eyes; and several hard phlyzaceous pustules appear on the nose and adjacent parts, and on the neck, trunk, arms, thighs, and legs. The temperature of the skin is increased; the pulse is remarkably frequent, soft and weak, or undulating; the respiration, rapid, weak, and shallow; the tongue dry, rough, and brownish red; thirst is unquenchable; the stools are watery, or slimy and offensive; the voice is weak, and the mind incoherent or wandering. Copious offensive sweats, a livid or gangrened state of the nose or of adjoining parts, delirium, tremors, and restlessness, are also observed; followed by sinking of all the vital powers, disappearance of the pulse, and death within a very few days; the fœtor from the discharges, and from the whole body, towards the close of the disease, being insupportable.

7. *Upon inspection post-mortem,* the morbid appearances, especially those which are external, are greater on one side of the body than on the other. The lungs are engorged with dark fluid blood; the bronchi are livid, congested, and partially filled with a dark frothy mucus; the nostrils and frontal sinuses contain a glutinous matter, of a brownish colour, and the lining membrane is studded with ulcerated white tubercles or granules; irregular ulcers, or white circular chancres, sometimes also exist in the upper parts of the air-passages; purulent deposits are occasionally found in some of the internal viscera; and the mucous surface of the digestive canal is softened and discoloured at various points. White tubercular formations, resembling those found in the membrane of the nose, sometimes also exist in the mucous membrane of the large bowels.

8. ii. *Acute Farcy Glanders* seems to commence

with severe pain in the joints and limbs, and with the other symptoms attending the invasion of the preceding variety. Small tumours arise in different parts of the body, but are more numerous on one side than on the other, and have a glossy red appearance, which soon changes to a dark brown. They also affect the head, or even the face, and chiefly on one side. They are painful, soon crack on the surface, and exude a thin acrid sanies: they vary in size, and are generally accompanied by phlyzaceous pustules in different parts of the body. Perspiration is free, copious, and fœtid; and the stools are watery, offensive, or otherwise morbid. The fauces are injected, and of a purplish hue; thirst is great; the tongue foul, loaded, and dark-coloured; the pulse quick, and easily compressed, afterwards small, and scarcely perceptible; and the other symptoms attending a fatal termination soon afterwards appear, as in the preceding form. On *inspection after death*, the tumours are found deeply seated. On removing the gangrenous integument covering them, a layer of brown glutinous matter is seen covering small white tubercles, having the same appearance as those found in the frontal sinuses, and nasal cavities, in acute simple glanders. These tubercles on the forehead or scalp are generally connected with the pericranium; but, on the limbs, with the fasciæ. — In some cases, on dividing the larger livid or gangrenous tumours, down to the bone, the muscles appear decomposed, are of a dark colour, exhale a peculiar fœtid odour, and contain specks of purulent matter, as it were infiltrated through their substance. Underneath these muscles, clusters of circular grey tubercles are also found, firmly attached to the periosteum, and resembling those that are more superficial, as in the pericranium, &c. The muscles generally, even those remote from the tumours, are blanched, flabby, or softened, and the cellular tissue is infiltrated with a yellowish serum. The Schneiderian membrane, frontal sinuses, and parts adjoining, are sometimes thickened, or studded with white tubercles. The blood is dark, fluid, and decomposed; and the heart flabby and pale.

9. When *acute farcy* is conjoined with *acute glanders*, the affection of the nares and respiratory organs, the phlyzaceous pustules around the nose and mouth, and the consequent fœtid, sanious discharge, and disorganisation, are associated with the foregoing phenomena; but the constitutional symptoms are not thereby otherwise changed, than in being aggravated, or rendered more malignant, or more rapid in their progress to dissolution. — In such cases, the morbid appearances of the nares, fauces, and respiratory surfaces attending the acute glanders, are superadded to those characterising acute farcy.

10. iii. *The Chronic Forms of Glanders.* — Simple chronic glanders is confined chiefly to one nostril, and is characterised by a glutinous and very offensive discharge, the fœtor being peculiar, and remarkably disagreeable. There are itching, with a constant desire to blow the nose, and a sensation of stuffing. In the slightest state of the disease, these may be the principal symptoms; but, in an advanced stage, or in severer cases, there are pain between the eyes and down the nose, with suffusion of the eyes, and ulceration of the Schneiderian membrane; the discharge being copious, puriform, or sanious. These symptoms are usually preceded by shiverings, giddiness, and by weakness and pains of the limbs; and are followed by more or less constitutional disturbance. As the disease proceeds, purulent collections form in different parts. There are, moreover, loss of appetite, nausea, swimming, or pains of the head, occasionally wanderings of the mind, pains in the back and limbs, thick, discoloured, or fœtid urine, and slimy, or otherwise morbid evacuations. From this state, the patient may slowly recover, after an indefinite period, or may sink gradually, from prostration of all the vital powers, with appearances of contamination of the circulating and secreted fluids.

11. *Chronic farcy glanders* are generally preceded and accompanied by chills or rigors, and aching pains through the body and limbs, resembling rheumatism. Tumours gradually form about the face, trunk, and limbs; these break and give rise to an unhealthy discharge; and are attended or followed by disease of the absorbents and glands, or by purulent collections in the joints, or in various parts of the body. The disease may commence in this manner, and thus terminate; or it may pass into the state of chronic glanders; or, in other words, the affection of the respiratory passages characterising simple glanders may be superadded; or, it may commence in this latter form, and be followed by the symptoms more especially marking the chronic form of farcy. In either case, the matter produces, as shown by the experiments of Mr. Coleman and others, acute glanders or farcy indifferently.

12. iv. The *Nature of this Disease* may be inferred from the history here given of it. It is evidently the result of a specific morbid matter, contaminating the surfaces and parts to which it is applied, affecting the organic functions, and giving rise to the changes characteristic of it. The state of the blood has not been sufficiently attended to in the history of the cases which have been put upon record. In several of those that occurred in Germany, the blood taken at an early period of the disease, appeared to be cupped or buffed; but it afterwards seemed deficient as to crasis, or partially dissolved, and very dark. In the variety of farcy, the absorbents, as well as the glands, appear to be much affected, probably owing to the passage of morbid matter along them; but there is much yet to learn as to the history of the disease, and the lesions which it occasions, and still more, as to its treatment.

13. v. The *Prognosis* of the acute varieties of glanders is extremely unfavourable; all the cases observed in the human subject having terminated fatally. The chronic states of the malady seem not much less dangerous. Two or three, however, of these which have been recorded, appear to have recovered. In one of those mentioned by Mr. Travers, the patient was cured by means, one of the principal effects of which was to produce frequent vomiting. Dr. Elliotson remarks, in his last paper on this disease, that its occurrence in the human subject is by no means of extreme rarity; and that, since the publication of his former paper, upwards of a dozen cases had been mentioned to him by medical men.

14. II. Treatment. — Our knowledge of the treatment of this malady has not been much advanced by the experience we have hitherto had

of it in the human subject. The *prophylactic means* are, however, made sufficiently evident by the recognition of its *cause*. There can be no doubt that it is communicated to man only by contact of the morbid matter proceeding from another person or animal suffering from it; and it would appear that the infection is most certainly produced by this matter being brought in contact with an abraded or punctured surface. Whether or not it is capable of producing the disease by being applied to the unabraded mucous surface, or by merely contaminating the air breathed by the unaffected, is certainly not proved as respects the human subject, although there are a few facts which seem to favour the affirmative conclusion. As regards, however, the horse and ass, there can be no doubt of the frequency of this mode of infection; and, indeed, of the possibility of the disease being generated *de novo*, when circumstances such as those already alluded to (§ 3.) contaminate the atmosphere, in which a large number of those animals are confined.

15. The *method of cure* is not so evident as the means of prevention. It may, nevertheless, be directed with the following *intentions*: — 1st. To arrest the progress, or change the character, of the local affection; — 2d. To moderate or modify the constitutional disturbance accompanying it; — and, 3d. To counteract the contamination of the fluids and soft solids taking place in its progress, and to support the powers of life. These indications require means for their fulfilment, possessed of energy proportionate to the violence of the disease; and whilst the local symptoms are attacked, the constitutional powers should be assisted in opposing their extension. With these views, the more volatile stimulating antiseptics, or warm aqueous vapour conveying their fumes, may be inhaled, or diffused in the patient's apartment. Solutions of the chlorides may be sprinkled around; or pyroligneous acid, with kréosote and camphor, or spirits of turpentine, may be scattered over the bedclothes, or put into an inhaler with warm water, and the fumes inspired. Any of the terebinthinates may be similarly used; and solutions of either of these, or of the chlorides, may be frequently injected, or employed as gargles. The chlorate of potash, or Labarraque's antiseptic solution, may also be tried internally; and stimulating diaphoretics prescribed, early in the disease. The vapour bath, with the fumes of camphor diffused in it; the warm bath, containing a sulphuret, or consisting of water in which aromatic or stimulating herbs are infused; the nitro-muriatic acid, or chlorine baths, &c.; are severally deserving of trial. Terebinthinate embrocations, as warm as they can be endured, may also be applied externally; or turpentine may be given internally, in small and often-repeated doses, with aromatics, &c. The various means detailed in the article Fever (§ 556. *et seq.*), with reference to the treatment of the typhoid varieties, may likewise be resorted to.

16. Dr. Elliotson mentions (*Med. Gazette*, vol. vii. p. 655.) that the veterinary surgeon of the 13th light dragoons treated this disease in the horse by putting a quantity of scalded bran, mixed with Venice turpentine, into a horse-hair bag, and tying it over the horse's head; the whole body of the animal being wrapped at the same time in a large blanket wrung out of boiling water, and covered with several horse-cloths. This treatment procured a profuse sweat, and a free discharge from the frontal sinuses and nostrils, and promoted the healing of the ulcerations. Dr. Elliotson also states, in his last paper on this disease, that the sedulous injection of a solution of kréosote up the nostrils removed the whole of the symptoms, in a case of *chronic* glanders in the human subject, after a very few weeks. — Mr. Storry (*Veterinarian*, vol. vii. p. 145.) adduces cases, in which fumigation with carbonic acid gas appeared beneficial in glanders occurring in the horse; but other means, as calomel, aloes, &c., were also employed.

17. In the *chronic*, as well as in the *acute states* of the malady, *tonics* or *stimulants* conjoined with *purgatives*, particularly cinchona, or the sulphate of quinine, capsicum, and camphor, with aloes, &c.; *antiseptics*, as the chlorides, hydrochloric acid, or chloric ether, kréosote, and pyroligneous acid; warm *alterative diaphoretics*, especially guaiacum, mezereon, senega, sassafras, sarsaparilla, variously combined; the terebinthinates, balsams, &c., and fumigating or medicated warm baths; may severally be prescribed and varied, appropriately to the characters of the case. The excessive thirst always attending the disease will be most beneficially quenched by a liberal use of soda water, spruce or ginger beer, Seltzer water, &c., which may be rendered still more cooling by the addition of small quantities of nitre, or of the subcarbonates of the alkalies; or they may be made the vehicles of several internal medicines.

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GLOSSITES. See Tongue — *Inflammation of*.

GOUT. — Syn. Αρθριτις (ἀπὸ του αρθρου); αρθριτικη νουσος, Hippocrates, Aretæus. *Arthritis*, Auct. var. Ποδαγρη, Hippoc. et Aret. Ποδαγρα (των ποδῶν ἄγρα, Lucian). *Podagra*, Auct. var. Ποδαλγια, Gr. *Morbus Articularis*, Pliny. *Chiragra*; *Arthritis Podagra*; *Morbus Dominorum*; *Gutta*, Radulphus, Bartholin, &c. *Febris Podagrica*, Vogel. *Podagra Arthritis*, Parr. *Arthrodynia podagrica*, Swediaur. *Cauma podagricum*, Young. *Arthrosia podagra*, Good. *Goutte Arthrite*, Fr. *Gliedersucht*, *gichtschmerzen*, *Fussgicht*, Germ. *Gotta*, Ital. *Gota*, Span.

Classif. — 1. *Class*, Febrile Diseases; 2.

Order, Inflammations (*Cullen*). 3. *Class*, Sanguineous Diseases; 2. *Order*, Inflammations (*Good*). III. CLASS, IV. ORDER (*Author*, in *Preface*).

1. DEFIN. — *Constitutional disorder, giving rise to a specific form of inflammation; often favoured by original or hereditary constitution; appearing after puberty, chiefly in the male sex; returning after intervals; generally preceded by, or alternating with, disorder of the digestive or other internal organs; and characterised by affection of the first joint of the great toe, by nocturnal exacerbations and morning remissions, and by vascular plethora; various joints or parts becoming affected after repeated attacks, without passing into suppuration.*

2. I. *Gout* is one of the diseases, the nature and treatment of which were best known to the ancients. — In modern times, however, the morbid relations and associations of the disease, and its various modifications have been more fully elucidated; and its treatment assigned accordingly with greater precision. But attempts at distinguishing its various manifestations, locally and constitutionally, and with relation to the numerous disorders arising in the gouty diathesis, have induced modern writers to make so many divisions of it, and to arrange its forms and states so differently, as to render its study somewhat perplexing to the inexperienced. This is one of the greatest objections that can be urged to the works of MUSGRAVE, GUILBERT, and some others. The arrangements adopted by some of the best writers on the disease are, however, very similar; and I will not materially depart from them. Those of CULLEN and GOOD nearly agree, and that of Sir C. SCUDAMORE and of Dr. MACKINTOSH is quite the same. Differing, therefore, but little from these writers, I shall consider — 1st, *Acute gout*; — 2dly, *Chronic gout*; — and, 3dly, *Irregular gout*. — The forms described by authors, under the appellations of *regular, acute, inflammatory, chronic, irregular, nervous, atonic, lurking atonic, primary asthenic, primary fixed, anomalous, wandering, internal, visceral, retrocedent, misplaced, latent, masked, emphysematous, flatulent, disguised, aberrant, &c.*, will be appropriately considered under one or other of the above heads.

3. i. HISTORY OF ACUTE GOUT. — *A. Of the Symptoms premonitory of the Paroxysm.* — Although the gouty paroxysm may attack suddenly a person apparently in good health, especially on the first occasion of its appearance, it is more frequently preceded by symptoms of disorder referrible chiefly to the digestive organs. I believe that, if the cases in which it is said to have appeared suddenly were investigated, it would be ascertained, that more or less disorder had existed for some days before the seizure, although not so as to have excited any concern in the mind of the patient. The most common symptoms of premonition are — flatulence, oppression after a meal, irregular appetite; heartburn, with acidity of stomach, sometimes with acid or acrid eructations; costiveness, irregularity, or, more rarely, an irritable state of the bowels; scanty, deep-coloured urine, becoming turbid or thick on cooling, or sometimes copious or pale urine; a sense of soreness, or occasionally of coldness, at the epigastric region; itching, or irritation of the skin; drowsiness, or frequent yawning, restless or unrefreshing sleep, more rarely nightmare; general lassitude and depression of spirits. In some persons, the symptoms of gastro-intestinal irritation are still more manifest, the tongue being loaded, red at its point and edges, the epigastrium tender, and the stomach oppressed after a meal. In many cases, increase of corpulency; scanty, thick urine; drowsiness, especially after eating, and a sense of general fulness and oppression, have preceded the paroxysm for a longer or shorter time, accompanied by several of the preceding symptoms. The appetite is frequently craving; and when indulged, is often followed by nausea, or vomiting of acrid matter, or by heartburn, flatulency, acrid eructations, &c. The premonitory symptoms vary in different persons, and depend much upon idiosyncrasy. Dr. MACKINTOSH justly remarks, that persons subject to gout are warned of a fit by some sensation or symptom peculiar to themselves individually: one feeling heat, pain, and dryness of the eyes; another, heat, redness, and swelling of the nose; a third, an unusual craving for some particular kind of food, or some peculiar feeling at the stomach, &c. Palpitations or internal flutterings; severe cough, with mucous expectoration; irritability of the bladder, the urine being loaded with mucus; a discharge from the urethra, with scalding, or difficulty in passing the water; unusual lassitude, and inaptitude for mental exertion; peevishness, irritability of temper; depression of spirits, more rarely an unusual hilarity; and various other symptoms, severally precede the paroxysm in different cases.

4. With more or less of these indications of constitutional disorder, the patient often experiences chills or rigors, followed by heat, flushings, headach, and the sensations referrible to the part about to be chiefly affected. These sensations, however, may have already appeared; but they are now more evident, and are increased during the night. The patient complains of weakness, tenderness, achings, numbness, prickings, or shooting pains, with spasms or a tingling sensation, in the limb; or of stiffness and weakness of the joints. A dark hue of the skin; fulness of the veins; swellings of the feet after exercise; disappearance of an accustomed moisture from the soles, with remarkable dryness and heat; and frequent change of position of the legs and feet, especially in bed, with general restlessness; are amongst the more constant precursors of the fit. One or both feet, particularly the soles, and the balls of the great toes, become burning hot: sometimes, however, they are cold, and are kept warm with difficulty; frequently the chilliness and coldness of the extremities alternate with feverishness, flushings, flying pains, and vertigo. Some of these symptoms, particularly the twitchings or cramps in the limbs, are felt chiefly when about to fall asleep, and are attended or followed by restlessness or watchfulness. Local signs of premonition are most common in persons who have experienced previous attacks. Where concretions have formed, severe pricking pains, with increased tenderness, are generally present. In those of an inflammatory diathesis, or who are plethoric, exposure to cold, or other exciting causes, may induce internal disease, with all the characters of idiopathic inflammation, which may continue for a longer or shorter time, and suddenly subside, being quickly followed by a regular paroxysm of gout; such instances,

however, belong to a form of the disease hereafter to be noticed.

5. *B. History of the regular Gouty Paroxysm.—a.* The first fit of gout, although commonly preceded by more or less of the above symptoms, sometimes occurs while the patient is in apparent health; but, even in this case, there have been indications of an inflammatory diathesis, or of vascular plethora, with slight disorder of the digestive organs. Most frequently he is suddenly awakened about midnight, or at one, two, or three in the morning, with severe throbbing pain in the affected part — commonly the ball of the great toe of one foot, attended by heat, stiffness, and a sense of distension and weight. These sensations increase to burning, with an actual augmentation of the temperature of the part, and with occasional severe stounding, or darting, pains up the limb. Restlessness, watchfulness, and fever increase, or continue, till about six or seven in the morning; when a gentle perspiration breaks out, followed by abatement of the symptoms, and some sleep in the slighter cases. The integuments of the part affected are swollen, slightly red, sometimes shining as if varnished; and the veins proceeding from it are remarkably full. In severe cases, but slight remission of the symptoms occurs for two or three days. More commonly, however, the symptoms abate in the day, but return, often with increased violence, at night, or shortly before midnight, and last till about five or six in the morning; the integuments have now become of a vivid or scarlet red, and admit of slight pitting on pressure. The pain is shooting, throbbing, intense, and gnawing, with an unpleasant sense of heat, burning, or weight. The least compression or touch of the joints cannot be endured.

6. *b.* The *constitutional symptoms* of the paroxysm vary with the severity of the attack, and the previous health of the patient. Fever is generally present, and commences as stated above. It is attended by restlessness, thirst, loss of appetite, oppression at the præcordia, flatulent distension of the stomach, with abdominal pain, costive or irregular bowels, morbid evacuations, and scanty high-coloured urine, depositing a pink or brick-dust sediment after standing, and sometimes containing mucus. The pulse varies, but is generally full or hard, and quicker than natural. Pain, heat, and tenderness of the epigastrium, with spasmodic sensations referrible to the stomach, are frequently complained of, and are attended by sour eructations, or vomiting of acrid or acid matters, sometimes mixed with bile, and causing unpleasant irritation of the pharynx and fauces. The tongue is furred or loaded, the papillæ erect, and the edges and point red. The stools are offensive, mixed with mucus, sometimes pale or clayey, but more frequently foul, blackish, or of an olive green. The symptoms altogether evince more or less irritation of the gastro-intestinal mucous surface, with obstruction or vitiation of the biliary and intestinal secretions. In old cases, and in persons far advanced in life, the attendant fever is much less inflammatory, and sometimes partakes more or less of the nervous character. In most instances, the nervous system evinces disorder by irritability of temper, increased sensibility, restlessness, and darting pains in the course of the nerves, very generally attended by violent cramps, or spasmodic contraction of the muscles of the affected limb, and sometimes followed by the sudden transition of the disease from one limb to the other. Almost any change of posture produces this spasmodic action, and the severe pain attending it. Sir C. Scudamore states, that of 120 cases, cramps occurred in 90, with more or less severity, either upon the accession of the paroxysm, or during its height, or at its close, or even during all these periods.

7. *c.* A first attack may *continue* from two or three days to ten or twelve. The œdema remains a short time after the inflammation, which disappears with desquamation of the cuticle of the part, and much itching. Sometimes the disease appears in the other foot, giving rise to the same succession of disorder, often with greater severity and prolonged duration. Sir C. Scudamore thinks that the first attack is more frequently mild in men than in women; and states, that of 198 cases, the great toe of one foot only was affected in 130; the great toe of both feet in ten; the great toe and instep in three; the instep of one foot in five; the instep of both feet in three; one ankle in ten; both ankles in one; the ankle and instep of one foot in four; the right knee and left hand in one; the back of one hand in two; and the wrist in one; various parts of the lower extremities, especially of the feet, being affected in the rest. He further remarks, that, in hereditary gout, the great toe is mostly the part first affected; and that the exceptions to this seat of a first attack, are chiefly met with in persons who have acquired the disease.

8. *d.* The frequency of the *returns of the fit* depends upon the constitutional tendency, the treatment, and the regimen, and mode of life of the patient. Although the disease generally returns to the part previously affected, the other foot seldom escapes. Each succeeding seizure is usually more severe and of longer duration than its antecedent, and the attendant constitutional affection more serious. Exceptions, however, to this may occur when the disease has been treated with judgment, and the patient has been careful of his health. The intervals also become shorter, and the parts affected more numerous; but the fits are most apt to recur early in the spring, or late in autumn, probably owing to the variability of the weather at these seasons; but they may occur at any season. The malady generally acquires strength with each returning fit, both as to the number of parts affected, and as to the duration and degree of suffering caused by it; the susceptibility to it increasing both locally and constitutionally, with the repetition of the attacks.

9. *e.* In some persons, the gout seizes only the feet; but, in more numerous instances, in its progress, several parts are attacked in the same paroxysm; the gouty inflammation affecting different places in succession, or at the same time, with equal or various degrees of severity. The feet, ankles, knees, and elbows are occasionally thus successively or simultaneously attacked; together with the ligaments, the bursæ mucosæ, sheaths of tendons or aponeuroses. In the older cases, even the shoulders and hips are sometimes affected. The disease often suddenly leaves one part, and as instantly appears in another; but it occasionally commences in one situation before it departs altogether from the other. This rapid transfer of the morbid action

from one part to another, either of the same or of a different limb, is one of the most characteristic phenomena of gout. When it thus passes to the opposite limb or extremity, some indications of the disease have often existed previously in that part. In a few instances, the chief suffering of the patient is in the day; in others, both day and night are passed in equal pain: but in most cases, particularly in the more recent attacks, the night is the period of greatest distress.—The redness and œdematous swelling are most remarkable in the foot, hand, and elbow. In the ankle, knee, wrist, &c., there is little redness, excepting in small patches, and the swelling is caused by effusion into the sheaths of tendons, and into the bursæ; the latter often being greatly distended, painful, and exquisitely tender. In the more severe cases, the veins of the limb are large and full, and unusually numerous near the affected part. The pain in gout is peculiar — is severe, burning, throbbing, shooting or stounding, and otherwise modified in different cases, as stabbing, cutting, boring, or gnawing.

10. *C.* The *Sequelæ of Acute Gout* respect — 1st. The effects of the disease in aggravating previous derangement, or inducing disorder of internal organs; and, 2d. The alterations produced by it in the part affected. — *a.* Severe attacks of gout impair vital power in the digestive, biliary, and nervous organs; or they may be said, with greater accuracy, to weaken still more the previously debilitated organic nervous influence. Hence occasionally result a numerous train of dyspeptic symptoms; hypochondriasis and torpid or otherwise deranged function of the liver; inaction of the cæcum and colon, causing a sluggish state of the bowels and morbid evacuations; increased liability to apoplectic and paralytic seizures, or to cramps, wandering pains, &c. Sydenham supposed that gout disposed to the formation of urinary calculi; and numerous cases have been recorded in which either they or gravel in the urine alternated with the gouty paroxysm. This connection has received support from the observations of Morgagni, Schurig, Buechner, Shroeder, Mursinna, Heim, and Forbes; but Sir C. Scudamore states, that irritation of the urinary organs and gravel occur rather before and during the paroxysm, than in the interval; and that calculus of the bladder is a very infrequent complaint amongst gouty persons; of 231 of whom, five only were so afflicted. This, however, does not altogether disprove the connection; as renal calculi may have existed in some, if not in many of these. He, however, adds, that the urine of gouty persons deposits, without any exception, at some period or other, either gravel or the pink or brick-dust sediment. There can be no doubt that the gravel is formed either in the kidneys, or in the urinary bladder; and if this be granted, a strong argument will be thereby furnished in favour of the occasional supervention of calculi.

11. *b.* The most frequent consequence of acute gout, as respects the local affection, is the passage of it into the chronic form; but before this degeneration may have taken place, several lesions of the tissues composing the part affected may be produced by acute attacks. These are — weakness, stiffness, and lameness of the joint, with a snapping or grating sensation upon motion, owing to imperfect secretion of the synovial fluid. The ligaments and muscular aponeurosis become thickened, stiff or inelastic, and tender. The secretion from the sheaths of the tendons is thickened or otherwise vitiated, causing a knotty and thickened feel upon examination, sometimes with contraction and rigidity. The bursæ mucosæ are enlarged, and either distended, or soft and yielding to the touch. The contents of the small bursæ are sometimes inspissated so as to form hard tumours; and the deep-seated textures of the joints become thickened and apparently consolidated. The veins of the feet and legs are often either enlarged or varicose; but these, as well as various other changes, as concretions, &c., are chiefly the result of the chronic disease.

12. ii. Chronic Gout. — *a.* This state of the disease is *characterised* by the inflammation and pain being more slight, irregular, and wandering, than in the acute; by the faint redness of surface, the permanent distension and œdema of the part; by impaired power of motion; by its more continued duration, and association with disorder of the digestive organs; by the languid or oppressed circulation; and by general irritation of the nervous system. It is generally a consequence of one or more acute attacks, either when the paroxysm has not passed off with a regular crisis or evacuation, or when repeated seizures have so enfeebled the constitution as to render it incapable of manifesting sthenic action. It may, however, appear primarily, constituting the *Primary Chronic Gout* of J. P. Frank. In this case, instead of severe paroxysms occurring at distant intervals, the seizures are much milder, but much more frequent, prolonged, and irregular. Primary chronic gout is more common among women than men — and in them, especially, seldom affects the great toe; sudden swelling, and pain, with but little of the appearance of the gouty inflammation, affecting chiefly the instep or ankle, or the wrist or hand. When chronic follows acute gout, the various parts which had been inflamed in the paroxysm of the latter, continue affected, either alternately or in conjunction; but the pains are more wandering, and have now and then a rheumatic or nervous character.

13. *b.* Whether primary or consecutive, *chronic gout* presents the following *local symptoms.* — A sense of alternate heat and coldness is felt in the affected part, and is much increased at night. There are often numbness and an uneasy sense of fulness and weight. The muscles and joints feel weak, and cramps of the lower limbs occur chiefly at night, when falling asleep. Startings and restlessness are generally also complained of. The surface of the part is either of a pale reddish colour, or of the natural hue, or of a purplish tint, the discoloration being sometimes transient. The parts are tender; shooting pains pass along the nerves; motion is difficult and painful; and the energy of the limb very much impaired. The bursæ and the sheaths of tendons are more frequently affected in the chronic than in the acute gout, occasioning puffiness and distension. Œdema is generally present and permanent, attended by fulness of the veins. Even in the slightest cases, aching and a sense of heat are felt in the ankles after walking.

14. *c.* The *constitutional symptoms* are remarkably diversified by the temperament and habits of the patients, the situation and degree of the

local disease, and by the nature and extent of the internal associated disorder. Numerous dyspeptic symptoms and uneasy sensations referrible to the stomach,—as craving for food, nausea, oppression after a meal, flatulency, heartburn, a sense of coldness at the stomach, transient pains, or spasms of the muscles of the abdomen or chest; a costive or irregular state of the bowels, with morbid or offensive stools; a deficient or unhealthy biliary secretion; and hæmorrhoids, with evacuations of blood; are often present. Feverishness or irritation follow too full a diet, or stimulating food; and a sallow or slightly yellow cast of countenance, with uneasiness or pain in the hypochondria, and deficiency of bile, are not infrequent. The urine is various, being sometimes scanty, high-coloured, or thick, or occasionally abundant and dilute: it generally deposits a pink or lateritious sediment. Palpitations and flutterings of the heart are very common, particularly when there is much flatulence. Sleep is broken, disturbed by unpleasant dreams, and unrefreshing; the temper is irritable, and the mind hypochondriacal, imaginary or trifling ills occupying the attention. In some cases, a chronic dyspeptic cough, or an increased secretion of mucus in the trachea, is complained of. Many persons, especially females, are exquisitely sensitive, and have their ailments increased by vicissitudes of atmosphere, especially by cold and humidity. In prolonged or severe cases, the system often becomes cachectic; the limbs weak, stiff, and wasted; and the abdomen large. Although the patient's appetite may be natural, yet he is neither nourished nor strengthened by his food, which may even increase both the constitutional and local affection.

15. *d.* The *concomitants or consequences* of prolonged chronic gout are, thickening and consolidation of the tissues of the affected part. The veins of the limb often become varicose, and increase the achings and fulness of the part, or cause purplish blotches of the surface, and, although rarely, ulceration of the skin. — *Gouty concretions* occur only in a few cases, and arise from the effusion of a whitish fluid, the watery portion being absorbed. Mr. Moore remarks, that this effusion occurs not only during the fits, but also in the intervals; that it is not enclosed in a cyst, but usually lies in the cellular membrane, in the bursæ mucosæ, or in the cavities of joints. In the sheaths of tendons, these concretions are generally hard or stony; in the bursæ, they are likewise hard; and in the cellular tissue, their consistence varies. They may also form between the cuticle and cutis; where they vary in consistence, or even occasion intractable deep ulcers, as in a case related by Mr. Herbert Barker. When they are situated within the capsular ligaments, the cartilage is absorbed, and one or more phalanges distorted. Sir C. Scudamore mentions several such cases. When the concretions cause ulcerations, the chalk-like matter is constantly secreted in a fluid or semifluid state, and accumulates in the bottom of the ulcers.* The surrounding surface is usually of a red colour, shining, and the seat of severe burning pain — symptoms occurring in paroxysms, with remissions or intervals of various duration. In such cases, erythema or erysipelas may be associated with the local affection. Although the concretions generally appear in the joints and surrounding tissues, they may occur in other situations, either simultaneously, or otherwise. Morgagni mentions their formation in the breast of a patient suffering from hereditary gout. In the case detailed by Mr. Barker, there was a gouty concretion of the size of a horse-bean deposited on the left side of the nose. Dr. Elliotson met with a case in which they formed in the ears. Their chemical constituents seem to be lithic acid combined with soda, potash, or ammonia, but mostly with soda, and with a little animal matter. They are of a light, or whitish grey colour; insoluble in cold, and partially soluble in boiling water.

16. iii. Irregular Gout. — Under this head may be arranged the various states of disorder, either occurring in the gouty diathesis, or connected with the appearance of the gouty paroxysm, or following its sudden cessation in an external part. In this extended acceptation of the term, *irregular gout* will comprise the brief consideration of those derangements to which the names *anomalous, imperfect, internal, visceral, misplaced, displaced, retrocedent, transferred, metastatic, wandering, flying, disguised, masked,* &c. have been applied. I shall, therefore, consider — 1st. Those specific or anomalous disorders appearing in the gouty diathesis, and followed by a complete or imperfect external gouty affection; — 2dly. The derangements consequent upon the sudden cessation of the gouty paroxysm; — and, 3dly. The various anomalous or disguised affections afflicting persons of the gouty diathesis, without being followed or attended by any manifestation of external disease. It has been urged by some modern authors, and even by the latest writer on gout, Dr. Barlow, that several of the forms just alluded to are merely internal disorders occurring in gouty persons, and differing, in their nature and treatment, in no respect from those usually observed; or, in other words, that these internal affections possess no specific gouty character. This is true in one point of view only, but not in others; for it must be admitted that the gouty are even more liable to internal diseases than healthy persons, and that these diseases will often pursue the usual course in the former as well as in the latter. That the gouty are very liable to nervous and functional disorders, especially those implicating the digestive and excreting functions, and that those disorders often present nothing peculiar, are generally admitted; but that many of the affections which either precede or follow the external manifestation of gout, or that appear in the gouty diathesis, differ very materially from those observed in other persons, is shown by the following circumstances: — 1st. Gouty inflammations of the eye are very different in their visible characters, their seats, and their consequences, from common ophthalmia; and every one possessed of due powers of discrimination, will

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* "An officer of temperate habits, who had undergone much active service, was, for some years before his death, ætat. 45, much affected with gout: many balls of chalk were removed from his hands, and he could write on the table with the point of his finger. Ulcers had also formed on his feet, which usually discharged an ounce of fluid chalk in the 24 hours." (*Catal. of Prepar. &c. in the Museum of Fort Pit*, &c. p. 167.)

admit that they require a different mode of treatment. 2dly. The knowledge we possess, however imperfect it may be, as to the changes and appearances consequent upon fatal internal disease in gouty persons, is conclusive of a material difference between them and those following more common maladies; and, 3dly. The *juvantia* and *lædentia* in the former are often very different from those in the latter.

17. *A. Specific or anomalous affections often precede* the external manifestation in a complete or imperfect form of acute or chronic gout. They may be either in every respect similar to other affections of the same seat, or very different and peculiar. In the former case, the external appearance of gout seems critical, and has been viewed as such by many writers; in the latter, it appears as the external manifestation of a constitutional disorder previously implicating the functions or sensibility of one or more internal organs. —In perusing the older writers, numerous instances present themselves of gout supervening upon, and appearing critical in, inflammatory and severe internal complaints. Morgagni considered himself cured of an ophthalmia that had resisted treatment, by an attack of gout. Dr. Baillie mentions a case of palpitation of the heart disappearing upon the occurrence of the gouty paroxysm; but these are not rare occurrences. Indeed, palpitations of the heart are frequently symptomatic of the disorder of the digestive organs ushering in the seizure. Affections of the urinary organs, erysipelas, asthma, and other diseases, have likewise been removed by a regular fit of gout. One of the most interesting illustrations of the succession and critical influence of gout upon dangerous internal disease, occurred to a medical gentleman whom I attended in 1824. He was seized in the evening with symptoms of complete congestive apoplexy, for which he was bled and purged, but without restoration of his consciousness. On the following morning, gout suddenly appeared for the first time, with great intensity in the ball of the great toe of the right foot, and instantly removed all the apoplectic symptoms, the mental functions being perfectly clear and undisturbed on my seeing him very shortly afterwards. When gout assumes a regular character, such antecedent affections appear merely as unusual precursors of the paroxysm, ushering in either the first seizure, or an attack in persons who had been previously affected by it.

18. *B. Retrocedent or displaced Gout — recedent, or transferred, or metastatic Gout — Podagra retrocedens — P. retrograda*, Cullen — *P. complicata*, Good. — *a*. During the gouty paroxysm in either its acute or chronic form, it sometimes happens that an internal organ becomes suddenly and dangerously affected, the external disease being either much mitigated, or having entirely disappeared. It has been disputed whether the internal disorder arises from the suppression or subsidence of the external affection, or whether the latter disappears in consequence of the occurrence of the former. Either may take place, as evinced by the succession of morbid phenomena, in different cases: the development of disorder in an internal organ, deriving it from external parts in some instances; and the suppression of the external manifestation of a constitutional disease, determining it to an interna predisposed viscus in others. When retrocession occurs in the height of an acute paroxysm, the superinduced malady is generally also acute, and rapid in its course; but when it takes place in the chronic form, it is often less severe and more prolonged. The internal affections, which thus arise, are generally caused by the patient's imprudence, by his habit of body and temperament, by previous disorder, or by injudicious treatment and management. The stomach is most liable to be affected, severe pain and spasm, with sickness, being complained of. The intestines may be also attacked, either alone or in conjunction with the stomach, with all the symptoms of acute inflammation; either form of disease often pursuing a violent or rapidly fatal course. Severe pain in the head, and symptoms of inflammation of the brain and its membranes, stupor, coma, apoplexy, epilepsy, or palsy, supervene in some cases, especially in those who have previously evinced a tendency to these maladies. In other instances, affections of the chest appear; particularly dyspnœa, sense of suffocation, oppression at the præcordia, with or without cough or expectoration. In some, pain or constriction in the region of the heart, violent palpitations, oppressed breathing, urgent anxiety, syncope, or leipothymia, &c. occur, indicating a serious affection of the heart or pericardium. In a case of this description recorded by Mr. Brown, and which terminated fatally some months after the disappearance of gout, the pericardium was thickened, and containing six ounces of bloody serum; the heart was greatly enlarged, and its substance was pale, soft, flaccid and attenuated, its internal membrane being of a deep violet colour; honeycombed ulcers were also observed at the root, and in the arch of the aorta. Other diseases of an inflammatory, spasmodic, or nervous character, or of these mixed, may follow the disappearance of the external gouty affection, more particularly dysentery, hepatitis, peritonitis, and various affections of the urinary or uterine organs. Dr. Cullen mentions strangury, catarrhus vesicæ, and hæmorrhoidal affections, amongst those not infrequently alternating with gout; and instances have occurred to myself, as well as to Sir C. Scudamore, Mr. Howship, and many others, of the transference of the morbid action to the kidneys, causing suppression of urine, or inflammation with partial suppression; or to the neck of the bladder with severe spasm, or even to the prostate gland. Mr. Howship mentions, that when gout is transferred to the kidneys, the urine becomes albuminous, as well as scanty. Dr. Home states, that a gentleman, who exposed himself to cold and wet, whilst affected by gout in the feet, was in a few hours afterwards affected by enteritis, which proved fatal in twelve hours; and Sir C. Scudamore mentions, that Dr. Parry met with two instances of extravasation in the brain in the same winter, after repelling gout from the extremities by immersing them in cold water.

19. *b*. The information we possess as to the lesions produced by the transference of the morbid action to an internal part, is extremely imperfect; many who have the opportunity, not giving themselves the trouble to inquire respecting them, or supposing that little or no alteration may be expected in such cases. Others, again, believe that

the changes consist chiefly of those produced by inflammatory action. Without disputing that the consecutive affection is frequently inflammatory, I have seen it, in several instances, possessed of a distinctly nervous and spasmodic character, or consisting chiefly of remarkable depression of power, with the abolition of the function of the organ principally affected, and most intense suffering. A medical friend, some years ago, whom I attended in the disease, took, contrary to my wish, and previously to removing biliary accumulations and morbid excretions, a large dose of colchicum; and was very shortly afterwards seized with violent pain in the stomach, a sense of sinking, and languid small pulse, the gout having instantly disappeared from the foot. I soon afterwards found him in the utmost agony, and prescribed large doses of camphor, with other diffusible stimuli, and mustard cataplasms to the feet. The gout as instantly returned to the extremities, and the affection of the stomach disappeared. A medical man, lately resident in Crawford Street, experienced, in 1830, an imperfect attack of gout in the feet. When I saw him, it had just forsaken this situation, and in twenty-four hours it successively had attacked the bowels, in the form of most violent colic, the diaphragm, and lungs, causing the most urgent dyspnœa; and lastly, the head, in a slight degree. The disease then appeared in one foot, and afterwards transferred itself to the other. In these cases, the phenomena of internal disorder were those of severe nervous affection, probably also connected with congestion, or irregular determination of blood; and the treatment founded on these views procured relief in them all.

20. Formerly, the internal affections thus connected with the disappearance of gout, were too exclusively viewed as nervous, and treated as such, notwithstanding the indications of inflammatory action sometimes attending them. More recently, and even at the present day, a very opposite opinion has been promulgated. Dr. GREGORY, of Edinburgh, supported this latter opinion, and was followed in it by Dr. BATEMAN and Dr. BARLOW. Fully admitting the inflammatory character of these consecutive affections in some cases, I must strenuously contend that it does not constitute the principal feature of them in others. In several instances, three of which occurred in medical men in this city, an inflammatory state could not be inferred either from the sensations of the patients, or from any symptom that I observed; and as the treatment founded upon the gouty and nervous characters of the disease was successful, there is no reason to infer that a latent inflammation had existed in these cases. That inflammatory and congestive affections of various internal viscera often occur, in such circumstances, cannot be disputed; but the practitioner should be prepared to meet also with very different and often anomalous disorders — to find some attended by the most intense suffering and distress; others by a feeling of sinking or dissolution; others by distressing anxiety, terror, and irritation; others by spasmodic action and morbid sensibility; and, lastly, others by constant pain, internal heat, distension, tenderness, and other indications of inflammatory action. In some, the pulse is weak, irregular, fluttering, small, or intermittent; in others, excited, frequent, irritable, but regular; or full, strong, and energetic. I have even seen it all these in succession, in the same retrocedent affection, and within a few hours. Some cases, even where the same organ is implicated, are attended by constant pain, a sense of increased heat, or of burning, remarkable tenderness, and excited pulse; and others, by remarkable depression, great languor, a sense of coldness or of weight, or oppression, a weak and languid pulse, and a feeling of vital exhaustion and of impending dissolution. Of the pathological relations of these different morbid conditions, more particular notice will be taken hereafter (§ 40—42.).

21. C. *Disguised or lurking Gout — anomalous, imperfect, internal, visceral, nervous, masked, or misplaced Gout — Podagra atonica,* CULLEN — *Podagra larvata,* GOOD. — The gouty diathesis may be generated in a constitution too weak to develop the local affection in the extremities. When this is the case, various disorders affecting internal organs, most frequently those of digestion and excretion, arise, and often assume anomalous or Protean forms, with functional or nervous characters, and even congestive or inflammatory states, as in retrocedent gout. In that variety, the internal disease is preceded by, and is rapidly consecutive of, the disappearance of an external gouty affection; but this variety is frequently unattended by any such affection, however slight or fugitive, although it may occur. It has been too generally inculcated, that the disorders appearing in the gouty diathesis have nothing peculiar in their character, or different from those observed in other circumstances. This subject has been already sufficiently adverted to, with reference to retrocedent gout; and the observations there made are equally applicable to those affections which appear in the lurking or disguised manner now being considered. When, in connection with the generation of the gouty diathesis, the constitutional powers have been greatly impaired, and the functions of excretion weakened, numerous internal disorders result, whether the patient may have experienced a fully formed fit of this disease or not. A fastidious or impaired appetite; a sense of distension and flatulence; acid or acrid eructations, or nausea or vomiting; spasmodic constriction, or most painful oppression at the epigastrium; costiveness and violent colic; mental depression, anxiety, or hypochondriasis; palpitations, or other irregularities of the heart's action; hemicrania, vertigo, and various affections referred to the head, or even palsy, epilepsy, or apoplexy; nervous excitement and irritability, with a sense of depression, and several other affections; sometimes present themselves, either with or without slight manifestations of gout in one or other of the external situations above enumerated. That those complaints are favoured by, and very often occur in, the gouty constitution, cannot be, and, indeed, is not, doubted. The question only is, whether these be of an inflammatory, or of a nervous, or of a mixed, or of a specific or peculiar character. That they are functional, chiefly, cannot be disputed; but that others of a more decidedly inflammatory or congestive kind may occur, as in cases of retrocedent gout, seems to be most consonant with the phenomena observed in different cases, and with the pathology of the disease, according to the view of it hereafter to be exhibited. Dr. HAYGARTH

has recorded two most interesting instances of misplaced gout, causing arthritic carditis in the one case, and enteritis in the other; and, although an attack of gout had not been experienced for many years, moderate depletions, and sinapisms applied to the extremities, were followed by the external gouty disease.

22. It is not unusual to hear persons who are advanced in life, and who have ceased to have their usual attacks of gout, complain of various nervous or functional disorders of so remarkable and peculiar a kind, as to convince them that gout is affecting or wandering through the system without developing its usual effects. Sir C. Scudamore very justly observes, that some gouty persons are affected with severe colic upon accidental exposure to wet and cold, or from acid or indigestible articles of diet; and that almost invariably these attacks are spasmodic and not inflammatory; hot brandy and water, or compound spirit of ammonia, giving relief. It should, however, be recollected, that the continuance of pain may cause congestion of, or inflammatory determination to, the affected part. The internal complaints occurring in the gouty diathesis are generally attended by sensations so distressing, and often so peculiar, as to excite suspicions of their nature in the mind of the patient, and to cause him to desire an attack of gout, however severe, in the extremities, believing that it will remove the internal and more dangerous sufferings. Sir C. Scudamore defines these affections "to be disordered functions of internal organs in a gouty constitution, and thereby modified in their charecter;" and in this opinion he has been followed by Dr. Barlow and others. Dr. Cullen, and those who preceded him, distinguished these complaints by the term "misplaced gout;" and, as it will appear in the sequel, the difference between the ideas intended to be conveyed by these terms, is more apparent than real; for the one, in admitting that such complaints are modified by the gouty diathesis, concedes all that is contended for by those who distinguish them by applying to them, without circumlocution, a term indicating at once their most important features and relations.

23. II. Diagnosis.—*A. Acute Gout* may be mistaken for *acute rheumatism*, which it may approach more or less near, when the latter affects the joints; or for common inflammation of these parts.—It seldom happens that more than one part is affected, and still more rarely that more than one is attacked at the same moment, in the first fit of gout. This character, however, cannot be extended to acute rheumatism. In the former, there is much more disorder of the digestive organs precursory of the attack, than in the latter, and the remission from pain and fever, during the day, is much more distinct. In *gout*, serous effusion into the cellular tissue is early in the fit, and to the extent of admitting of slight pitting on pressure; the veins are turgescent in the vicinity of the affected part; the pain is pungent, severe, burning, stounding, lancinating, or peculiar; the surface is inflamed, deeply red, shining as if varnished, turgid, and exquisitely tender; the temperature of the part is very much increased; and the urinary secretion is remarkably disordered, generally depositing a quantity of the pink or lateritious sediment, consisting of the lithate of soda, the tinging substance being the purpurate of soda. These symptoms are either absent or slightly marked in acute rheumatism.

24. The hereditary character of gout; the frequency of it in the plethoric, sanguine, and irritable constitutions, and at an advanced age; the sudden incursions of the fit; and the commencement of it in the small joints; further serve to distinguish it from rheumatism. Although gout may affect the knees, shoulders, elbows, &c., after repeated attacks, or in its chronic form, it rarely commences in these situations; whereas rheumatism generally begins in the shoulders and larger joints.—It is sometimes, however, observed that the patient, on recovering from the one disease, may be attacked by the other, upon exposure to its exciting causes; and a person, who early in life has lived frugally and laboriously, and been subject to attacks of rheumatism, has, at a more advanced age, lived fully and indolently, and been attacked by gout. In either case, the patient himself has no difficulty in distinguishing between them; and the experienced practitioner will have as little, however much he may be at a loss to convey his ideas respecting their diagnosis to others. It is not so much by any one mark, as by the concurrence of several circumstances, connected with the causes, the constitutional disturbance, antecedent and existing, and with the local characters, that a correct diagnosis can be formed. *Common inflammation of the joints* cannot be mistaken for acute gout, if the character of the pain, the state of constitutional disorder, and the urinary secretion, receive attention. The continued or unremitting state of the symptoms, and the course, progress, and termination of the disease, will also serve to distinguish them.

25. *B. Chronic Gout* may be distinguished from *chronic rheumatism* by several of the circumstances already adverted to.—The former is much more frequently preceded by the acute disease, and by disorder of the digestive and excreting functions, and is very much oftener attended by swelling, thickening, or nodosity of the affected parts, than the latter. However, cases not infrequently occur, in which gout, in its more chronic form, very nearly resembles chronic rheumatism, there being but little disorder of the above functions attending them. In forming a diagnosis, the temperament, habit of body, age, and mode of living should be taken into consideration. Dr. Haygarth observed, that only 14 patients out of 300 ill of chronic rheumatism had swelling in the seat of disorder. It should, however, be recollected, that when chronic rheumatism affects the bursæ mucosæ, and thecæ of tendons, particularly those of the knee joint, considerable tumefaction takes place. Although the gout, in its chronic form, is still more fugitive than when acute, and thus approaches nearer to the nature of rheumatism, yet it is much more disposed to seize the hands and feet than that disease, as well as to be more solitary in its situation. The parts which have been often affected with gout become very susceptible of changes of temperature; and, in this respect, partake of the rheumatic character. Sir C. Scudamore thinks that it is only in this way that any propriety can be attached to the expression *rheumatic gout;* and conceives that gouty and rheumatic inflammations cannot both exist in the same part at the same time, although they may occasionally co-exist in different parts; as when a

patient suffering gout in the usual situations is seized with rheumatism in the muscles of the neck, or in the shoulder, or other parts, in consequence of exposure to currents of cold air, &c. When gouty concretions form, the nature of the complaint will be sufficiently evident.

26. *C.* It is a matter of great difficulty to discriminate between the internal affections characterising *irregular gout*, and similar affections unconnected with this disease, as may be inferred from what has been already advanced on the subject. It is only by applying sound principles of pathology to the investigation, guided by much acumen and experience, that we can expect to distinguish between them. When called to a patient advanced in life, of the irritable and nervous temperament, complaining of violent sufferings, or of various nervous and functional disorders, or of severe spasmodic affection, we should endeavour to ascertain, from the state of the pulse and the temperature of the surface, from the sensations produced by a minute examination, from the appearances of the excretions, and from the history of the case, especially with reference to its causes, and to previous attacks of gout, and to any hereditary predisposition to it, the exact pathological condition upon which the symptoms depend. The existence or non-existence of inflammatory action, or the degree in which either may be mixed up with spasm, or morbid sensibility, should be ascertained. Many writers, both previous to, and contemporary with, Dr. Cullen, considered debility and spasm, with altered sensibility, to be more characteristic of retrocedent and misplaced gout, than inflammatory action; and this opinion seems to have been too generally and often injuriously adopted. But I am convinced, that, in more recent times, the opposite doctrine has been too exclusively confided in, and with little less injury as to the results.—The practitioner, in all such cases, should be guided by pathological inferences derived from the phenomena characterising individual cases; and if he find the pain fixed, the pulse excited, or hard, or oppressed, the skin hot, and the parts tender or painful on pressure, he will deduce the existence of inflammatory action: whereas, if the pulse be weak, small, irregular, or indistinct, and compressible; if the skin be cool, the countenance collapsed or anxious; the surface relaxed and perspirable, the parts tolerant of pressure, and if no unnatural sound be detected on auscultation and percussion; he will infer the presence of functional disorder merely or chiefly, or of spasm, or of depression of nervous power with altered sensibility.

27. III. Prognosis.—The prognosis should vary with the form which gout assumes.—*A.* In the *regular acute disease*, a favourable opinion may generally be given, if the internal organs betray no serious lesion of function or of structure. The subsidence of sympathetic fever; improvement in the excretions, the urine ceasing to deposit a sediment, or losing its high specific gravity; a return of the appetite, and of the spirits; desquamation of the inflamed cuticle, with disappearance of the swelling; are indications of recovery. The sudden transference of severe affection from one part to another, especially if accompanied with painful sympathy of the digestive organs, or with nervous symptoms and exquisite susceptibility, or with irregular fever, and with persistent disorder of the excretions, are signs of a difficult and intractable disease. In this form of gout especially, the prognosis should be influenced chiefly by the state of the excretions; for as long as the stools and urine continue morbid, other signs of amendment will prove delusive.

28. *B.* The prognosis in *chronic gout* is more unfavourable than in the acute, as respects subsequent immunity from the disease. As to recovery from the seizure, the circumstances just stated will influence the opinion of the practitioner, as in the acute variety. In every case, however, the state of constitution and of internal organs, and the effects produced by treatment, should be taken into account, in deciding respecting the duration or the event of the disease.— *C. Internal affections* occurring either in the gouty diathesis, or upon the sudden disappearance of the external disorder, are always unfavourable in proportion to their severity, and the vital importance of the parts in which they are seated. When the heart, the brain, or the stomach and intestines, are the seats of *retrocedent* or *misplaced gout*, the patient should be always considered in the utmost danger; especially if he be far advanced in life, if nervous energy be much impaired, and if judicious treatment has not immediately produced the desired effect. Cases of this description, however, not infrequently recover when appropriate and decided means have been promptly resorted to, and when the constitution of the patient has not been remarkably injured.

29. IV. Causes of Gout.—i. *Predisposing Causes.*—These may, as in other diseases, become exciting causes, owing to continued or energetic action.—*a. Hereditary disposition* has always been viewed as most influential in the production of gout. Cadogan, however, attached too little importance to it, and Cullen too much. It is very probable that it will evince various grades of influence in different classes or states of society;—that it will seem of greater importance in those who live regularly, soberly, and laboriously; and of much less, in those who are indolent, luxurious, or dissipated. Sir C. Scudamore states, that of 213 persons afflicted by gout, 84 could not trace it either to the father's or mother's side. But it is probable, conformably with what has been just stated, that an unusually large proportion of non-hereditary cases will be met with amongst the indolent and luxurious inhabitants of a large metropolis. Of the hereditary cases, 62 were derived from the father, 29 from the mother, 14 from both father and mother, 14 from the grandfather, &c. When both parents have had the disease, a greater number of the children will experience it. Where one parent only has had it, the child or children having the greatest resemblance to that parent will be most liable to it.

30. *b. Adult age*, particularly from 25 to 50, is the period at which gout most frequently first appears. Sir C. Scudamore states, that of 209 cases, 25 had the first attack between 20 and 25 years of age; 38 between 25 and 30; 41 between 30 and 35; 37 from 35 to 40; 18 from 40 to 45; 25 from 45 to 50; and 11 between 50 and 55. Gout is rarely met with before puberty. Hippocrates first stated this fact, and it has been confirmed by Sydenham and many other writers. Heberden never saw an instance of it. Dr.

Scudamore mentions a case at 8 years of age. I treated one, many years ago, at 11; and am at present attending a boy of 9, recovering from a severe attack in the foot. Very early seizures have generally been observed where the hereditary predisposition has been strong. In the two cases just alluded to, it existed in both parents; and, in one of them, there was great precocity of intellect. In some cases, where the disease appeared very soon after puberty, premature or excessive venereal indulgences seemed to me to have aided in its production.

31. *c.* The *male sex* is much more disposed to gout than the female.—Hippocrates mentions the non-liability of females until the cessation of the menses. This, however, is not correct; for cases occur at an early age in the plethoric through indolence and high feeding, and in those who have not had children. I met with an instance of it in a female of 27 years of age, who was thus predisposed. Dr. Gregory observed, in his Lectures, that females subject to gout had experienced menorrhagia, or had become plethoric from ingurgitation; and Dr. Cullen has remarked, that robust and masculine females, before the menses have ceased, or those in whom they have been very abundant, are not infrequently attacked. The instances of gout which I have seen in this sex, previously to the change of life, have been chiefly in those who had suffered frequent or excessive menstrual evacuations, who had lived very fully and indolently, and who had not been pregnant. The relative immunity of females is evidently owing to their temperance, to their periodical evacuations, and to the discharges and secretions connected with childbearing.

32. *d. Habit of body and temperament.*—Gouty persons are said to have capacious and circular chests, with large full veins, and loose solids; but to this rule there must evidently be numerous exceptions. Sydenham remarks, that the gross and corpulent, and those with large heads, are most frequently affected. J. P. Frank states, that the *gouty conformation* consists of a large and full body, voluminous head, large bone, and thick skin. Sir C. Scudamore found that, of 226 males, 64 were tall and corpulent, 41 middle height and corpulent, 25 short and corpulent, 28 middle stature and bulk, 14 tall and middle bulk, 21 short and middle bulk, &c.; and that of 28 females, 9 were tall and corpulent, 8 short and corpulent, 4 middle height and corpulent, and 4 short and slight. Corpulence usually precedes the disease, and often increases with the progress of it. The gouty generally possess good constitutions, abused by indulgence. The sanguineo-nervous and irritable *temperaments* are the most liable to be attacked by gout, although other diatheses may be also affected. — Cadogan ascribed gout to three causes, which generally act conjointly; namely, *indolence*, *intemperance*, and *vexation*. Taking these in their wide signification, their importance cannot be controverted. In whatever *station of life* they prevail, particularly indolence and intemperance, gout will appear as one of the most frequent results; hence it is not infrequent in butchers, innkeepers, and publicans; and in butlers, coachmen, and porters in wealthy families, as well as in the more easy classes of society. It is, in short, met with in all occupations which conduce to inactivity and repletion.

33. *e. Venereal excesses* are amongst the most unequivocally predisposing causes, especially if associated with the intemperate use of animal food and of wine; for whilst the former species of excess exhausts the nervous power, the latter occasions plethora, and both combine to impair the functions of digestion, assimilation, and excretion; hence the ancients said that gout was the daughter of Bacchus and Venus. The wines which favour most the production of gout, are champagne, new port, and the clarets; but other wines have more or less influence, and are more productive of the disease than malt or spirituous liquors. Strong malt liquor disposes to it even more than spirits. Dr. Cullen justly remarks, that gout never attacks those following laborious occupations, or who live chiefly on vegetable food, or use neither wine nor other fermented liquors. Schenck, Van Swieten, and other authors, have adduced numerous instances of persons, who, during a life of luxury and indolence, had been subject to this disease, but had never afterwards suffered from it when their circumstances required them to live abstemiously and laboriously. In countries where animal food, and vinous or intoxicating liquors, are little used, gout is almost unknown. The habit of partaking of a great quantity or variety of animal food is not less influential than other kinds of intemperance in causing the disease. Severe study has been considered to predispose to it; but this cause is merely apparent or indirect, others of a less doubtful kind also existing. The depressing passions are not without influence, inasmuch as they weaken nervous energy and the functions of digestion and excretion. A cold and variable climate favours, also, in some degree, the formation of the gouty diathesis; and the changeable weather in spring and autumn, and the cold winds and humid atmosphere of these seasons, have a similar effect. The disease is comparatively rare within the tropics, unless amongst those who have indulged in those habits which are most influential in predisposing to it; and yet two of the severest cases I ever saw, occurred nearly under the equator in Africa.

34. *f.* Functional disorder of the digestive organs is one of the most universal causes of gout. Many of the causes already noticed, and of those about to be mentioned, act partly by weakening these organs, and favouring congestion of, or inflammatory determination to, the mucous surface. It is not, however, a state of inflammation of this surface, but rather of vascular erethism, that is thereby generated. Hence the appetite, instead of being impaired, is often increased; and the patient is prompted to take more food than the stomach and collatitious viscera can digest and assimilate. When the appetite is impaired, owing to the digestive mucous surface having assumed a more inflammatory state, frequent attempts are but too often made to excite it by stimulating and savory articles of diet; and the mischief is thereby augmented. Even where functional disorder only exists, inflammatory irritation is superadded, attended by the severer symptoms of indigestion — by acrid eructations; by painful distension and soreness of the epigastrium; by congestion and impaired action of the liver; by interruptions of the passage of bile into the duodenum, accumula-

tions of it in the gall-bladder and ducts, and a redundancy of its constituents in the blood; by acidity of the *primæ via*, and an imperfectly elaborated or unhealthy chyle; and ultimately, as will be hereafter shown, by a morbid state of the circulating fluids. But these are merely accessories to the formation of the gouty diathesis; other conditions, particularly vascular plethora, being also required; and this state, with the various other elements of the gouty constitution, is that which is generated, in a greater or less degree, by the causes now passed in review.

35. ii. *Exciting Causes.*— Whilst the foregoing causes act chiefly in generating the gouty constitution, or predisposition, those about to be mentioned are mainly concerned in exciting or developing the paroxysm. The sudden repletion and inflammatory excitement of the vascular system in connection with irritation of the digestive mucous surface, produced by excessive indulgences at the dinner table, frequently occasions a fit in a few hours, when the morbid diathesis is already formed; and, when the excess is repeated, particularly in quick succession, the morbid effect rarely fails to take place. Champagne excites an attack more certainly than any other wine. A lady under my care, and who had not passed her 30th year, always suffered more or less on the following day, after taking a single glass of champagne; but the excessive use of any wine, especially if new or of inferior quality, will produce a seizure. The use of malt liquor during dinner, and of port wine afterwards, will excite it, if active and regular exercise be not taken. Strong malt liquors and spirits will often have a similar effect, especially if much animal food be habitually eaten. It is not only indulgence in wine or other exciting liquors, or the admixture of them, that is injurious; for a great quantity and variety of animal food, and of highly seasoned dishes, which they excite the stomach to receive until it is overloaded, are equally prejudicial. Acidity of the *primæ via*, from the imperfect digestion of the mass of different substances partaken of, inflammatory irritation of the digestive mucous surface, disorder of the biliary secretion and excretion, vascular plethora excessively or suddenly increased on each of such occasions, and the accumulation of excrementitious and irritating matters in the blood, are the common consequences of these indulgences. In many cases, not merely acid, but acrid or acro-rancid, combinations are formed by the imperfectly digested substances and the disordered secretions poured into the alimentary canal; and these increase or perpetuate the irritation of the mucous surface, whilst they exert upon the organic nerves a noxious influence, which is more or less manifested throughout the digestive circle, as well as in the extreme parts of the frame.

36. Neglected or constipated bowels, and interruption of any of the excreting functions, will occasionally be followed by an attack, without any cause having occurred that could have acted in any other way than this. Cold seems to operate, partly by suppressing the excretions, and partly by depressing nervous power. Its effects in exciting a paroxysm, whether applied to the general surface or to the extremities, or to any part, are well known. Fatigue and external injury not infrequently produce an attack: and the injured part is usually its seat; especially in cases of sprains, contusions, or concussions. The passions of the mind, also, have no mean influence. All powerful mental emotions, whether exciting or depressing, will excite a paroxysm; but anger or vexation has this effect in a very remarkable manner. The ancients made Anger to be the midwife of Gout; and CADOGAN considered vexation, in its wide signification, as one of his three great causes of the disease. The depressing passions, particularly fright, severe grief, anxiety, &c., may either occasion an attack, or cause its retrocession, or give rise to a misplaced affection, or to some one of the irregular states of the disease noticed above, particularly in persons who have been formerly affected. Besides these, mental and bodily labour, especially when they abridge the requisite duration of sleep; the sudden cessation of habitual evacuations and excretions, as of the catamenia, hæmorrhoids, the *sudor pedum*, &c.; cold, flatulent fruits or vegetables; and acidulous liquors or beverages, sudden changes of diet or regimen; and whatever disorders the digestive and excreting organs, or suddenly impresses the nervous system; may excite the gouty paroxysm, either when the predisposition has been fully formed, or when an attack has been experienced. It is from a combination of two, or several, or even of many causes, that the disease is occasioned, especially if it appear independently of any hereditary taint. In a few instances, this taint seems almost sufficient to produce it, without the aid of any manifest intemperance. This remark was made by GALEN, and HOLLER and others have confirmed it. Cases sometimes, also, occur of persons entitled by both parents to be subject to the disease, who have escaped it, although they lived intemperately. QUARIN states, that he knew two brothers, sons of gouty parents: one of them lived soberly and laboriously, yet was horribly affected with gout; the other exposed himself to its common causes, and altogether escaped it: but these are rare exceptions from the general course of events. — It appears that females frequently acquired gout in ancient times, inasmuch as SENECA (*Epist.* 95.) mentions the circumstance as a proof of the depravity and luxury of his age.

37. V. The PATHOLOGICAL CONDITIONS, on which gout depends, may be inferred from what has been already advanced as to its causes and phenomena. — *a*. The older writers imputed it to a peculiar morbid humour existing in the blood. This *materies morbi* has been somewhat differently explained. — GALEN considered that it may be phlegm, or a mixture of phlegm and bile, or even blood, or all these, or simply a crudity of the circulating fluids; and that the gouty concretions arise from the crude humours.—PSELLUS believed that it is a thick humour generated and collected by an atony of the nutritive faculty.—ALEXANDER TRALLIANUS contended, that the defluxion of humours occasioning gout is various, according to the local changes and symptoms existing in different cases — that they are bilious, phlegmatic, melancholic, or even sanguineous; and that these occasion pain by getting between the tendons and ligaments, and distending and irritating them. — AËTIUS maintained the disease to arise from a redundancy of humours caused by weakness of the part affected. — CÆLIUS AURELIANUS assigned the remote cause of gout with great accuracy, and

explained its nature in a nearly similar manner to the preceding writers. — PAULUS ÆGINETA considered that a preternatural humour and a weakness of the parts combine in producing the disease; and that the remote causes, which he enumerates very correctly, generate indigestion and a cacochymy, whence proceed various morbid humours which are bilious, melancholic, or sanguineous; but, for the most part, pituitous and crude, owing to excess of food and want of exercise. He attributed tophi or chalk-stones to thickness and viscidity of the humours, and the chronic or protracted forms of the disease to the admixture of several of these humours.

38. The doctrine of the humours, and the manner they give rise to arthritic complaints, have been fully explained by MACROBIUS (*Saturnalia*, vii. 4.). Mr. ADAMS, in the learned notes to his translation of PAULUS ÆGINETA, remarks that the theory of the humours, notwithstanding its being at present in little repute, accords better with the phenomena of the disease, and is a more successful guide to practice, than any hypothesis recently advanced. A similar preference to it has been given by SPRENGEL. It should also be mentioned, that the ancients, particularly those just noticed, recognised the hereditary character of the disease, and peculiar diathesis of gouty persons. The opinions of the Arabian writers are not materially different from those just stated. The most interesting production on the disease that has appeared, was written by DEMETRIUS PEPAGOMENOS about the middle of the 13th century, and was published at Paris in 1558. He states the remote causes of gout to be long-continued indigestion, repletion with food, drinking too much wine, venereal excesses, indolence or unaccustomed exertion, and retention of the natural secretions; the venereal excesses, especially, weakening the tone of nervous parts. These causes give rise to imperfect digestion, and the accumulation of excrementitious superfluities requiring to be evacuated from the system. When these excrementitious matters are retained, morbid humours are produced, and collected in the affected joints. This very ingenious writer further remarks, that when crudities or morbid humours are formed in the system, those parts which are vigorous cast them off; but that those that are weak are unable to accomplish this; and hence collections of such humours take place in them.

39. *b.* Many of the writers of the 16th, 17th, and 18th centuries were induced, by the appearance of the urine, and the concretions formed in the joints, to account for the phenomena of the disease upon chemical principles. — PARACELSUS first, and HOFFMANN and others long afterwards, ascribed the local and constitutional affections to the presence of tartaric salts in the blood, — an opinion very generally adopted until the middle of the last century. More recently, FORBES, PARKINSON, WOLLASTON, HOME, BRANDE, and others have endeavoured to show that there is always a redundance of uric acid in gouty persons; and, as will be shown hereafter, there can be no doubt that the constituents of this acid exist in them in excess. But this species of change is merely one of the elements of the gouty condition. The connection of the disease with plethora was very justly insisted on by Dr. CULLEN; and Dr. PARRY conceived that the paroxysm had a salutary influence in reducing a plethora relatively great, in restoring the balance of the circulation, and in determining the blood from internal and vital parts to the extremities. Here, again, is a part adduced for the whole of the mischief. Dr. SUTTON supposed that the cause of disorder is seated in the alimentary canal; but he attempted nothing beyond this very indefinite explanation. BROUSSAIS is more precise, if he be not more correct, in stating gout to be one of the several morbid manifestations depending upon inflammatory action in the gastro-intestinal mucous surface. In this opinion he has been pretty closely followed by ARMSTRONG, MACKINTOSH, and several writers of his own country. Dr. BATEMAN, Sir C. SCUDAMORE, and Dr. BARLOW have ascribed the disease to vascular plethora. Dr. BARLOW, especially, insists upon its inflammatory and plethoric nature, but pushes his doctrine too far; whilst he overlooks the connection of plethora with other morbid conditions.

40. *c.* It is indispensable to a correct view of the subject, to comprise all the elements forming the constitutional and local affections to which the term gout has been applied. If we analyse the numerous phenomena preceding, constituting, and following the disease; if we connect these with the causes most essential to their production; and if we refer to those agents which increase or diminish the severity of the symptoms; we must necessarily arrive at the conclusion, that gout does not depend upon one morbid condition only, but upon several; that neither the superabundance of excrementitious matters in the blood, arising from imperfect or effete assimilation — from the ultimate results of animalisation; nor vascular plethora, absolute or relative; nor gastro-intestinal irritation; nor gastro-hepatic disorder; is individually sufficient to explain all the changes constituting the disease; although they may be sufficient when viewed in connection. But, even when thus considered — especially if we push the analysis sufficiently far — some antecedent and concomitant lesion must be inferred. If we view the several causes in the connection and succession in which they usually give rise to gout, we must necessarily conclude, that the organic nervous energy is impaired or exhausted by them; and that, as the organic class of nerves bestows its influence on the digestive, the secreting, and excreting functions, exhaustion of its powers will impair the functions of the organs which it supplies. The necessary consequences of such impairment will be imperfect digestion and assimilation, torpor of the liver and bowels, impeded and disordered secretion and excretion, redundancy of excrementitious matters in the circulation, and vascular plethora, arising from deficient excretion, and from a continued supply of nourishment aided by a stimulated appetite. These may be viewed as the elements of the gouty constitution or diathesis; and, when it is formed, the local action will be excited by either, or by several, of the causes mentioned above (§ 35, 36.). That most of these causes affect the organic nervous influence more or less directly, is shown by the impaired or otherwise disordered functions of the organs more especially endowed by this system. To functional disorder and morbid sensibility succeed the accumulation of effete and irritating matters in the blood, and excited

vascular action, either local or general, or both. These matters aggravate the morbid sensibility and irritation, particularly in situations most prone, by previous disorder or debility, to experience either or both.

41. It is, however, not easy to explain satisfactorily wherefore the morbid action should manifest itself in the extremities, and assume peculiar characters, otherwise than by referring both circumstances to the previous change produced in the system — to the antecedent diathesis, either original or acquired; and to the morbid condition of the nerves, and of the exhalations and secretions of parts most remote from the centres of nervous power and of circulation. Weakness of the remote nervous ramifications will necessarily influence the circulation and secretions of the parts which they supply; and when the blood abounds with excrementitious matters, the exhaled and secreted fluids will necessarily possess preternatural or morbid properties, which will affect the sensibility of the extreme nerves, and irritate the tissues in which they are deposited. There are various phenomena, especially the sudden transition of the affection — which is sometimes as quick as electricity — from one part to another, that cannot be explained otherwise than by referring them to the organic nervous system. If we consider the intimate connection that exists between this system and the rest of the economy, and particularly the influence which it exerts upon the vascular system, which it supplies throughout; and view both in their intimate relations with one another, and with the rest of the frame, — if we contemplate them as intimately interwoven together — as possessing numerous and diversified communications with all the viscera and compound structures, — we shall easily conceive, that the altered sensibility existing in one part of this nervous circle may readily be transferred to other and distant parts, with the varying state of nervous influence, and with the several causes which may suppress it in its existing seat, or derive it to other organs; that a change in the state of the organic nervous influence, when preternatural or intense, may very obviously affect the capillary circulation and vascular action; and that, both nerves and capillaries being thus affected, the exhalations and secretions of the part will be also changed, particularly when the fluids circulating to it are in excess, or abound with excrementitious matters; the alteration of the fluids, both circulating and secreted, exalting the morbid sensibility and vascular irritability, and perpetuating the suffering, until the cause is removed, or both conditions are exhausted.

42. If this view be correct, several disputed matters connected with the disease will be more readily explained. For when the predisposition or diathesis is formed, and the organic nervous influence is morbidly affected in one or several parts, and the vascular system is inordinately repleted, causes affecting either the one or the other will not infrequently transfer the morbid action from one seat to another. The local affection of gout being the external manifestation of a constitutional disease, the suppression of it in one part will often be followed by its appearance in another; and its spontaneous extension to a new situation will as frequently derive it from its former seat; — for as long as the constitution continues in fault, nervous power being impaired, the vascular system overloaded, and the blood abounding in excrementitious matters, some organ must experience more or less prominent disorder. This view of the nature of gout further enables us to account for the primary seizure of an internal part or viscus; for, in proportion to the deficiency of nervous power, or to the abundance or vitiation of the circulating fluids, or to the weakened or congested state of some viscus, will the disposition to a misplaced or lurking form of gout exist; the vital manifestations being incapable of developing the disorder in the extremities, owing either to their impairment, or to the extent of the derangements just mentioned, or to both circumstances conjoined.

43. VI. TREATMENT. — i. The *Opinions of the Ancients* as to the treatment of gout, are in many respects as deserving of notice as those of modern writers. Indeed, there is little difference between the views of some of the former on this subject, and those of the latter. As at the present day, so in ancient times, were cold applications to the part, and colchicum internally, advised by some and condemned by others; so also, as may be seen from the *Tragopodagra* ascribed to LUCIAN, were numerous nostrums lauded for the complaint, as well as a rational treatment pursued by the regular practitioners of physic; and so also, as at the present day, the habits and irregularities of the patient brought discredit on the science of the physician, and led to the too general adoption of the opinion of OVID, that —

> "Tollere nodosam nescit medicina podagram."

44. HIPPOCRATES recommended purgatives by the mouth and by injection, and cooling applications to the part. In the more chronic cases, he advised means similar to the moxa of the Japanese.—CELSUS also prescribed refrigerant applications to the affected part; but he likewise had recourse to warm fomentations conjoined with anodynes, and to depletions. — ARETÆUS seems to have trusted chiefly to hellebore, and to applications of wool moistened with various substances, as oil, oxycrate, &c. — GALEN commenced the treatment of gout by evacuating offending matters by bleeding and purging; he afterwards had recourse to discutient applications. — CÆLIUS AURELIANUS directed blood to be abstracted from the part by scarifications, and sponges squeezed out of hot water, or oil and water, or a decoction of fenugreek, to be afterwards applied. He also prescribed gentle emetics and aperient clysters. He disapproved of burning the parts, and of the indiscriminate use of narcotics; but advised warm bathing, spare diet, emollient ointments, and afterwards gentle exercise. He enjoined complete abstinence from the commencement of the attack; and at its decline he prescribed a medicine nearly the same as the Portland powder. — ORIBASIUS confided chiefly in bleeding and purging, especially in plethoric persons, and in the spring. AËTIUS evacuated redundant humours by these means; and afterwards endeavoured to strengthen the parts.

45. ALEXANDER TRALLIANUS adopted a treatment which he viewed as appropriate to his pathology of the disease. In cases proceeding from a bilious humour, as indicated by burning heat and

the absence of swelling, he prescribed chologogue purgatives, consisting chiefly of cathartics and bitters conjoined, and cooling anodyne applications to the affected parts, with spare diet. When occasioned by a phlegmatic humour, indicated by the absence of heat and redness, he considered calefacients to be beneficial, and refrigerants injurious; and recommended a combination of purgatives and attenuants, as hellebore, thyme, cumin, &c. After purging, he directed warm attenuants internally, and calefacient anodyne cataplasms to the external affection. When there was general fulness of blood, or determination to the affected joint, he advised bloodletting, and abstinence from wine and animal food, and discutients to the part. He has remarked, that some insist upon taking medicines to allay at once the violence of their pains, not choosing to submit to a methodical treatment; but that he does not approve of this practice. For this purpose, he adds, the *hermodactylus* is particularly trusted to; and he admits that it seldom fails to remove a paroxysm; but he also affirms that it occasions more frequent returns of it. The identity of hermodactylus and colchicum is highly probable, as maintained by Prosper Alpinus, Sir H. Halford, and others. Alexander has further stated, that some endeavour to correct the prejudicial effects of this medicine by adding to it cumin, mastic, or ginger, thinking that its action is narcotic; but this he affirms to be a mistake; for in that case it could not prove cathartic. He admits, however, that these things may correct its bad effects upon the stomach; and he therefore prescribes a combination of the hermodactylus with aniseed, pepper, and myrrh, or with aloes, scammony, elaterium, colocynth, &c. He preferred, however, the *coronopodium* (which Mr. Adams, in his learned commentaries on Paulus, believes to be the buckthorn plantain or *plantago coronopus*), as it procures evacuations and relief from pain, without injuring the stomach.

46. Paulus Ægineta advised a nearly similar method to that adopted by Alexander. He employed chologogue purgatives for the evacuation of bilious humours, when he inferred gout to arise from this cause; and numerous cooling and anodyne cataplasms to the affected part, with a refrigerant and diluent diet, avoiding repletion and the use of heating dishes or liquors, as well as mental emotions and venereal indulgences. In the sanguineous form of the disease, and in the first attacks, he enjoined bloodletting and purgatives; the latter consisting chiefly of a combination of colocynth, aloes, black hellebore, and scammony. Some, he has remarked, have recourse to purging with hermodactylus; but it is bad for the stomach, producing nausea and anorexia, although it removes the disease very speedily. In gout from a mixture of humours, he also had recourse to depletions in early attacks; but, after frequent seizures, he considered the loss of blood injurious. Besides these, he directed a variety of both internal and external means; many of which deserve adoption, and are similar to those hereafter to be noticed. With respect to *prophylaxis*, he advised a moderate use of wine, exercise, and frictions of the joints, morning and evening, with oil triturated with salt.

47. The opinions of the Arabian physicians differ not materially from those of the Greeks. — Serapion, Avicenna, and Rhases recommended evacuations and the hermodactylus. — Haly Abbas directed bloodletting in cases proceeding from sanguineous plethora; and used cooling applications to the joints. For the bilious defluxion, he prescribed emetics and drastic purgatives, consisting of scammony, aloes, colocynth, and hermodactylus; and for the serous or phlegmatic defluxion, very nearly the same means, the local applications being varied. The treatment adopted by Alsaharavius was almost identical with that pursued by Alexander, Paulus, and Haly Abbas.

48. Demetrius Pepagomenos has justly remarked that the *prophylaxis* of gout is easily prescribed, but followed with great difficulty. It consists in great moderation in eating and drinking, and in avoiding indigestion. Viewing the disease as one of repletion, he ordered evacuations for its cure, consisting of emetics, bloodletting, and purgatives, and with a very judicious reference to the form and stage of the disease. He forbade the use of strong emetics; but vomiting by gentle means he had recourse to at the commencement. In early attacks, and at their beginning, when there was evidence of plethora, he prescribed bloodletting; but he considered it prejudicial in other circumstances, or much inferior to active purging. He was favourable to the use of hermodactylus as a purgative, and combined it with aromatics. In other respects his treatment was similar to that of Alexander.

49. The reader will observe, from what has been just stated, how little has been added to our knowledge of this subject by the numerous productions that have appeared since the revival of learning in Europe; and that, although there is much that is trifling, a little that is absurd, and something that is questionable, in the doctrines and treatment of gout adopted by the ancients, there is also much deserving of commendation and adoption.

50. ii. *Treatment of Acute Gout.* — The *indications* are — 1st. To avert a threatened attack; — 2d. To alleviate the symptoms during the paroxysm; — and, 3d. To prevent the return of the disease, by suitable regimen and medical treatment, after the paroxysm has ceased. — *A.* In order to avert, or to render more mild, a threatened attack, the *premonitory symptoms* should be treated promptly and judiciously. Much suffering and injury to the constitution have arisen from the idea that the paroxysm is a salutary effort of nature, and that the prevention of it may be followed by serious consequences. There is, however, some truth in the opinion; for, as I have shown, the external affection being the outward manifestation of constitutional disease, the suppression or prevention of it in an external part may lead to results still more severe than the impending attack. But it is the suppression of the paroxysm by means which leave the constitutional disorders untouched, or which increase them, that is injurious, and not the prevention of it by remedies directed to the removal of these internal disorders themselves, in which the attack originates. A large dose of an acro-narcotic, as of colchicum, veratrum or veratria, aconitum, &c., has often the effect of suppressing the morbid sensibility, and with it the irritative vascular action of the seizure; and thus frees the patient

from the impending suffering for a time. But it leaves the internal disorders, of which the external is merely a part, in the same state as before, or even increases them; inasmuch as it tends to weaken organic nervous power, to irritate the digestive mucous surface, and to impair the functions of excretion; and the consequence is, either a more frequent return of the precursory symptoms of the attack, or the supervention of some serious visceral disease. The means, therefore, to be had recourse to, in order to avert the paroxysm, should be those only which are calculated to remove the internal derangements, in which it originates. These derangements we have seen to be — weakened organic nervous power; a torpid state of the functions of the liver, with accumulations of bile in the biliary passages and liver; congestion of this viscus; fæcal accumulations in the large bowels; collections of mucous sordes on the digestive mucous surface; vascular erethism, or inflammatory irritation of this surface; and the superabundance of excrementitious matters in the circulation. Means, therefore, which will remove these conditions, and prevent their recurrence, will the most effectually avert both a threatened paroxysm, and a return of the disease.

51. Guided by those views, general *bloodletting* may be employed in robust and plethoric persons. If signs of congestion of the head or of the liver be present, or of inflammatory irritation of the digestive mucous surface, local depletions may be substituted, or used in addition to the general evacuation. The quantity of blood taken away should depend upon the age and strength of the patient, and other circumstances of the case. Hæmorrhoidal or other spontaneous evacuations ought to be encouraged by aloetic purgatives, &c. If the tongue be much loaded, and if heartburn, acrid eructations, or nausea be complained of, neither pain nor tenderness of the epigastrium being present, an *emetic* will generally be of service. But if vascular depletion be indicated, it should be premised. Emetics have been recommended by Celsus, Fabricius Hildanus, Gesner, Stoll, Scudamore, and others: they will be found most serviceable as here advised; in other circumstances, they are doubtful means, and require much discrimination. If indigestible matters remain in the stomach, emetics should not be withheld; but when there are pain and tenderness at the epigastrium, with determination to the head, they may be injurious. — In almost every case *purgatives* should be prescribed, although the bowels may have been said to be regular or open; for collections of morbid secretions in the biliary organs, and of fæcal matters in the cells of the colon, may nevertheless exist. Therefore, a full dose of *calomel*, with *camphor* or with *James's powder*, or with both, may be given at bed-time, and a stomachic purgative the following morning. The draught here prescribed, I have found most efficient, especially when the bowels are very sluggish; and the frequent repetition of it is attended by no disadvantage: —

No. 233. ℞ Infus. Gentianæ Comp., Infus. Sennæ Comp., āā ℥j.; Magnes. Sulphatis ʒjss. (vel Sodæ Subcarbon. ℈j.); Tinct. Cardamom. Co. et Tinct. Sennæ āā ʒjss. M. Fiat Haustus, quamprimum mane sumendus.

52. If the excretions continue to present, or assume morbid appearances, a small dose of blue pill, or of hydrargyrum cum creta with soap, or a full dose of calcined magnesia, should be taken at bed-time, and the above draught in the morning, until they assume a natural character. If the precursory symptoms continue nevertheless, I agree with Sir C. Scudamore in considering that the constitution is labouring under the causes of the paroxysm, almost as much as if the attack had been developed, and that the treatment required during the paroxysm should be resorted to. If the means here recommended restore the functions to a healthy state, abstinence or moderation in diet, regular exercise, especially on horseback, mental quietude, and early hours, should be strictly observed.

53. *B.* The *Treatment of the Paroxysm* should be varied according to the age, strength, and habit of body of the patient, to the predisposing and exciting causes, to the duration and characters of the paroxysm, and to the frequency and severity of the previous seizures. — *a. Bloodletting* is required in the plethoric and robust, and in early attacks, when the constitution is unbroken, and the inflammatory diathesis evidently exists. In these circumstances it has been advised by Celsus, Galen, Alexander, Horstius, Riverius, Jumelin, Le Tellier, Sydenham, Patten, Huxham, Cullen, Hosack, Musgrave, Macbride, De Vernevil, Heberden, Scudamore, &c. It has been too strongly insisted upon by Hamilton, Rush, and Barlow; whilst it has been considered injurious by Trampel, Barthez, Hallé, and Guilbert, unless when the inflammatory action is very manifestly developed in some internal organ; or in strong plethoric persons, when the general vascular excitement is very great.—The practitioner should be guided as to the extent of the depletion, by the circumstances above alluded to; keeping in view the fact, that the disease is one more of irritation than of inflammation; that the vascular excitement is in great measure the consequence of the morbid sensibility, and will subside as it is subdued. *Local depletions* are often preferable to general bloodletting, particularly when tenderness, or fulness of the epigastrium or hypochondria, is present, and will generally be sufficient to remove hepatic congestion, and vascular excitement of the gastro-enteric mucous surface. When bloodletting is clearly indicated, it should not be delayed; as the benefit it is calculated to afford will be diminished very materially by delay; the debility consequent upon unmitigated irritation, rendering the deferred depletion of little or no avail.

54. *b. Alvine evacuations* are of less doubtful efficacy even than vascular depletion.—*Emetics* are sometimes of service at the commencement of the paroxysm, when the symptoms indicating (§ 51.) the propriety of resorting to them are present. In some cases they mitigate the attack; whilst in others they have little or no effect upon it. They ought to be employed with caution. When the case requires both vascular depletions and an emetic, the latter ought not to be exhibited until the former has been carried into effect. —*Purgatives* are of the most unequivocal benefit. Many of the empirical remedies employed against the disease are serviceable only in as far as they increase the alvine excretions. As vascular congestion of the liver, and accumulations of bile in the biliary passages, are often connected with the production of the fit, such purgatives as promote

the circulation in this organ, and increase its excreting function, should be selected. With this view, from five to ten grains of calomel, with four or five of James's powder, may be given at bedtime, and the draught prescribed above (§ 51.) early on the following morning. If these do not act in the course of a few hours, a dose of magnesia, and of sulphate of magnesia in any aromatic water, may be taken, and repeated until the bowels are freely opened. Purgatives were actively employed in gout by the ancients, *veratrum* and *hermodactylus* having been chiefly used with this intention. Rhazes advised a cathartic to be repeated eight times. Riverius, Riedlin, Thilenius, Cadogan, and most English writers, have recommended them. Schrœder preferred the preparations of rhubarb; and these, conjoined with magnesia, or any of the other purgatives in common use, may be prescribed. Sir C. Scudamore prescribes the *colchicum* in the first aperient draught, giving from one to two drachms of the acetic preparation, neutralised by magnesia, and conjoined with the sulphate of magnesia. This medicine he repeats at intervals of four, six, or eight hours, according to its action, and the urgency of the symptoms. Although this is amongst the mildest of the preparations of colchicum, especially when its acetic acid is neutralised by magnesia, yet I have seen it, in this dose, productive of serious effects; and it is more likely to be injurious when it fails in acting upon the bowels; for in this case its influence is exerted upon the nervous system, and not upon the excreting functions — the morbid sensibility being partially suppressed by it, but the source of disorder remaining untouched. The consequences are, either a frequent return of the fits, or a continuance of the internal affections in aggravated forms, or the supervention of some one of the irregular states of the disease. Where biliary accumulation or congestion of the liver exists, a large dose of colchicum, unless conjoined with an active stomachic purgative, may, in the early stage of the paroxysm, so suddenly suppress it, as to give rise to the serious affections alluded to under the head of retrocedent and misplaced gout (§ 18. 21.).— This is no suppositious case, for two such instances have fallen within my own observation, one of which has been already adverted to (§ 19.).

55. In early fits of the disease, when much inflammatory excitement exists, *colchicum* may be conjoined with the cooling saline purgatives, and with magnesia, as Sir C. Scudamore advises; but the dose should be much less than just mentioned, and ought seldom to exceed half a drachm of any of the fluid preparations; and it should not be given more frequently than thrice in the day, until the effects are observed; as even in this quantity, I have seen it have, in some constitutions, a very remarkably sedative influence, producing even serious symptoms. In several persons, and three of these members of the profession, I have observed that even twenty drops of the mildest preparations of colchicum could not be taken without most distressing internal irritation, and a sense of sinking being produced. This effect still more frequently occurs in the atonic or chronic states of the disease. Therefore, when the patient is either advanced in life, or has suffered repeated attacks, or is possessed of weak constitutional power, the combination of colchicum with antacids, and warm stomachics, or the spiritus colchici ammoniatus, will be most appropriate; and either the infusion of senna, or of rhubarb, or the decoction of aloes, may be added to them, in such quantity as may be required to operate freely on the bowels.

No. 234. ℞ Infus. Caryophilor., Infus. Sennæ Comp., āā ʒ vj.; Magnes. Calcinatæ ℈ j.; Tinct. Rad. Colchici, ♏ xxv. (vel Aceti Colchici ʒ ss.); Spiritus Pimentæ, ʒ ss. M. Fiat Haustus, ter in die sumendus.

No. 235. Infusi Aurantior. Comp., Infus. Rhei, āā ʒ vj.; Magnes. Carbon. ℈ j.; Vini Seminis Colchici ʒ ss. (vel Spirit. Colchici Ammon. ♏ xxxv.); Tinct. Cardamom. Comp. ʒ j. M. Fiat Haustus, sextâ quâque horâ sumendus.

No. 236. Decocti Aloës Comp. ʒ vij.; Aquæ Menth. Virid. ʒ ivss.; Tinct. Seminis Colchici ʒ ss.; Spirit. Ammoniæ Arom. ʒ j. M. Fiat Haustus.

No. 237. Sodæ Sub-carbon. ʒ ss.; Vini Colchici (vel Spirit. Colchici Ammon.) ʒ ss.; Infusi Sennæ Comp., Infusi Aurant. Comp., āā ʒ vj.; Spirit. Lavand. Comp. ʒ j. M. Fiat Haustus.

56. It will often be necessary, especially when the countenance is sallow or bilious, the hypochondria and epigastrium full, or tender on pressure, to exhibit on alternate nights, or even every night, a dose of calomel, or of blue pill, with James's powder. But care should be taken that the mercury does not produce its specific action, which very generally will be prevented by the active exhibition of the purgatives just mentioned. Where much febrile excitement exists, James's powder, or some other antimonial, with or without an anodyne, according to circumstances, should be prescribed; and if nervous power be much reduced, two or three grains of camphor may be either substituted for these, or conjoined with them. The colchicum may be given in the form of pill, the powder being combined with camphor and the watery extract of aloes, or the aloes and myrrh pill, three or four doses being taken in the 24 hours, and as much of the purgative as will operate sufficiently on the bowels. The action of colchicum is exerted chiefly on the digestive mucous surface and liver, the secreting functions of which it manifestly augments. When it does not pass quickly off by the bowels, it is partially absorbed, and increases the functions of the kidneys. It was employed by the ancients, and physicians of the middle ages, and entered into the composition of most of the gout specifics of every epoch. Stoerck introduced it into regular practice in modern times, and used it chiefly as a diuretic. Mr. Want brought it into use in 1815 as a cure for gout. Since then it has been very generally, and but too often injudiciously, employed in this and in other diseases.

57. Cathartics are not equally suited to all cases. Where the bowels are very torpid, the liver congested, and the tongue loaded, they (see *Appendix*, F. 181. 266. 378. 430.) are necessary, and it is chiefly by them that we can remove the excrementitious matters abounding in the circulation. But in other instances, particularly when these disorders do not exist, or when the bowels are easily relaxed, or are irritable, and when the patient is nervous and debilitated, aperients or laxatives, and saline medicines with the alkali in excess, or calcined magnesia with or without colchicum, will be more serviceable than active purgatives, unless conjoined with tonics, aromatics, or stimulants.— Neutral salts, taken so as to act gently upon the bowels, have generally also a refrigerant effect; and being partially absorbed,

exert a beneficial influence on the circulation and functions of the kidneys. When the saline medicine is conjoined with an alkali or with magnesia, these effects are still more manifest, and not only are the intestinal discharges increased, but the urine is rendered more copious and natural. Colchicum judiciously combined with these will often allay pain, bring down the pulse, and promote the secretions from the liver and kidneys; but if it occasion depression or nausea, it should be discontinued. Although purgatives are unequivocally beneficial when employed as here advised, yet Sydenham, Warner, and most French writers have condemned the use of them in this disease. Even Heberden does not appear favourable to them. This, however, evidently arises from either an injudicious use of them, or inappropriate modes of exhibiting them.

57. *c. Diuretics* are beneficial in this disease, in as far as they promote the removal of excrementitious matters from the circulation. The saline substances already alluded to, and the alkalies, are, upon the whole, the most preferable of this class of medicines. Of the former, the citrates of potash and of soda, the acetate of potash, and the sulphates of soda and magnesia, are to be preferred; and of the latter, the fixed alkalies, and magnesia. M. Mazuyer recommends potash and its acetate, from an opinion that the presence of uric acid in the blood is a principal cause of the disease. Alkalies in various forms have been long recommended in gout. In the form of soap, they have been prescribed by Boerhaave and Whytt. Their subcarbonates were used by Tozzi, Quarin, Blane, Gardner, Wollaston, and others. The alkaline earths have, however, been preferred by several writers, especially when acidity of the *primæ via* existed. Whytt and Blane were favourable to lime-water, and preparations of chalk, in these circumstances. Magnesia, both calcined and carbonated, has been generally employed, and is preferable, upon the whole, to any other absorbent, inasmuch as it acts gently upon the bowels and kidneys, without weakening the digestive mucous surface. Its effects in removing the morbid state of the urine in gouty subjects, which has been so well described by Dr. Prout, and noticed above (§6.14.), are very remarkable. The liquor potassæ, or Brandish's alkaline solution, exhibited in a bitter infusion, with the extract of taraxacum, or in the decoction of taraxacum, will also be found useful, especially when chronic disorder of the liver is present; small doses of blue pill, or of Plummer's pill, with soap, being given at bedtime, and the emplastrum ammoniaci or the emplastrum picis compositum conjoined with it, being placed on the epigastrium, and right hypochondrium. The preparations of squills, or the spiritus ætheris nitrici, may be given with the saline and alkaline substances just noticed, when the urinary secretion is scanty.

58. *d. Diaphoretics* during the paroxysm have been recommended by some writers, and disapproved of by others. There can be no doubt of perspiration being a favourable evacuation in this, as in many other diseases, inasmuch as excrementitious matters are thereby removed from the system. Quarin remarks, that those who sweat much, or void much urine, are rarely afflicted with gout; and the reason is obvious. Sir C. Scudamore states, that sudorifics should be given with some caution, as they tend to debilitate the stomach; and this is doubtless the case with respect to the common preparations of antimony, although Rhodius, Riverius, Vicat, Brandis, and Hufeland prescribed them when inflammatory fever accompanies the paroxysm: and in this state they are beneficial, especially when conjoined with gentle refrigerants and narcotics. Dover strongly recommended his celebrated powder in this case; but he employed nitre, instead of the sulphate of potash of the more modern preparation. *Camphor*, however, in doses and combinations appropriate to the circumstances of the case, is a most unexceptionable medicine, inasmuch as it has an anodyne effect, whilst it promotes the exhalations and secretions. It may be conjoined with James's powder, or with mercurials, or with anodynes, or with all of them, according to existing pathological states. It has been almost entirely overlooked by recent writers on the disease, although it was recommended by Lentin, Chrestien, Collin, Bang, and Osiander. I have prescribed it frequently, especially in the more chronic and irregular forms of gout; and found it, particularly in conjunction with opium, or the acetate or muriate of morphia, a most valuable remedy. The decoction of *guaiacum* was much employed by Sabarot, Tode, Weismantel, Gruner, Smetius, Theden, Aaskow, Ackermann, Duncan, and Baldinger; but it is more suitable to the atonic or chronic states of the disease than to the acute. It is, however, sometimes useful, conjoined with alkalies and anodynes, after the bowels have been freely evacuated, in old cases and in debilitated habits. It is most beneficially exhibited in the form of compound decoction, as prescribed in the Edinburgh and Dublin Pharmacopœias; or in that of the ammoniated tincture, when debility is considerable.

59. *Warm baths* and *vapour baths*, simple and medicated, have been long recommended as diaphoretics, for the removal of gout in its various forms. Actuarius, Zacutus Lusitanus, Lentin, Girault, Quarin, Brandis, Albers, Schacher, Ruland, Pallas, Waiz, Molwiz, Oliver, and Ingram prescribed them. Sulphuretted baths, warm salt-water baths, and aromatic warm or vapour baths, have been favourably noticed by Thilenius, Quarin, Albers, and Hufeland. The simple vapour bath was much praised by Marcard and Blegborough; and warm baths prepared from a decoction of emollient herbs, by Pelargus and others. The *camphorated vapour bath* promises to be more serviceable than any of these, although they are severally of advantage when appropriately used.

60. If the patient be young and robust, or suffering a first or early attack, or if the constitution be not materially impaired, and especially if vascular excitement and pain be very great, the several means already noticed may be so prescribed as to produce decided antiphlogistic and refrigerant effects. The *antiphlogistic treatment*, to the fullest extent, has been advised by Langius, Werlhof, Hufeland, Barlow, and others; and in the circumstances just specified, or even in others more equivocal, it is more or less beneficial. — *Refrigerants*, as nitre, muriate of ammonia, &c., have been given internally by

Marcus, and others; and, in the above circumstances, they may be serviceable; but in persons of weakly habits, and in the more protracted cases, their effects should be carefully watched. In most instances, the saline aperients and diuretics prescribed above prove sufficiently refrigerant; and the more cooling diaphoretics, particularly camphor julep, the solution of the acetate of ammonia, and spirits of nitric ether, have a similar effect.

61. *e. Narcotics* have been long employed during the height of the paroxysm, both internally and to the affected part. Aëtius, Zacutus Lusitanus, Mayerne, De Launay, and many others have recommended them. — *Opium*, either in its crude state, or in the form of Dover's powder, or of Sydenham's laudanum, has been preferred by De Heide, Doemling, Nunn, Warner, Matthæi, Kinglake, Marcus, Sutton, Guilbert, &c. Several writers have, however, chosen either the black drop, or Battley's solution, whilst contemporary practitioners have recourse more frequently to the acetate or muriate of morphia. More advantage, however, will accrue from the judicious combination of the opium with other remedies, than from a selection of either of these preparations. Opiates ought never to be prescribed until fæcal accumulations and morbid secretions have been evacuated. If prescribed earlier, or otherwise improperly used, they are liable to the same objections as have been urged against colchicum — one of the effects of which, it should be recollected, is anodyne. Dr. Cullen remarks, that although they mitigate the severity of the fit, they occasion its return with greater violence; but this objection holds equally strong in respect of all narcotic and anodyne substances employed without sufficient regard to the removal of those morbid conditions of the internal viscera upon which the disease chiefly depends. It is, therefore, indispensable to a successful treatment, to evacuate morbid matters previously to the use of these medicines; and to promote the action of excreting organs, whilst we employ them. In weakly habits, or where there seems to be a state of asthenic or irritative action in the fit, and particularly if the external affection shifts its seat, the opiate should be conjoined with camphor, in doses proportioned to the urgency of the nervous symptoms, or of vital depression. This combination will promote the cutaneous excretion; the camphor preventing any tendency to the retrocession or suppression of the paroxysm that may exist, or that the opium may occasion. Hamilton, Plenciz, and some other writers have advised calomel to be conjoined with the opium. When chronic disease of the liver is present, the practice is judicious; but purgatives should also be prescribed, and the effects carefully watched. The mercurial ought to be withdrawn when relief is obtained, or as soon as it evinces its specific action. Where there is much febrile excitement, the opiate will be usefully conjoined with James's powder, or other antimonials, or with ipecacuanha and refrigerants. The acetate or muriate of morphia should be preferred when opium occasions headach, gastric disorder, or other unpleasant effects; and either may be given with aromatics, camphor, &c., according to the peculiarities of the case. A large dose of the extract of *white poppy* may be directed in similar circumstances.

62. *Aconitum* has been recommended chiefly by Continental physicians, and is certainly a medicine of greater efficacy than is generally supposed in this country. It has been favourably noticed by Stoeller, Boehmer, Reinhold, Stoerck, Quarin, Stoll, Vogel, Collin, Murray, Thickness, Warburg, Zadig, Barthez, and Brera; but it is more appropriate to old or chronic cases, or to weak habits of body, than to recent attacks attended with general vascular excitement. The powdered leaves, or the extract, may be used. Besides its narcotic effect, it produces a very decided action on the skin. *Belladonna* has likewise been prescribed by Ziegler, Boetscher, and Mönch; *Conium*, by Percival, Solenander, Coste and Thickness; the *Humulus Lupulus*, by Freake; and the *Lactucarium*, by Duncan and Scudamore. *Hyoscyamus* is, however, preferable to either of these, when it is desirable to avoid constipation of the bowels. I have, however, seen the belladonna very serviceable in two or three instances; and in these it produced its specific eruption on the skin.

63. *C. Local Treatment in the Paroxysm.* — *a. Leeches* have been applied to the inflamed part by Werlofh, De Haen, Boyer, and Mackintosh; and even *scarifications* have been advised by Salmuth, Thilenius, Riedlin, Hoffmann, Bauer, Reusner, and Watts. Sir C. Scudamore remarks, that he has seen, in a few cases, the application of leeches followed by the sudden transition of the inflammation to the other limb, indicating that the constitutional causes were not relieved by the local loss of blood; and that he has generally found the debility of parts and œdema both greater and more lasting after this practice. In three instances, where he directed blood to be taken from the distended veins near the foot, an increase, rather than diminution, of pain was the consequence in two, and much local weakness in the third of them. — *Blisters* applied to the affected part have been recommended by Bouvart, Riedlin, and Stevenson. Trempel considers them injurious; and Dr. Cullen admits the occasional efficacy both of them and of urtication, but considers them hazardous. They are sometimes, however, useful in the more chronic or asthenic states of the disease. — *Moxa*, as a local application to gouty joints, has been resorted to in Eastern countries from time immemorial, and appears to have been known to Hippocrates and subsequent ancient writers. Amongst the moderns, Bose, Ten Rhyne, Thilenius, Pechlin, Theveno, Acerbi, Pallas, Kaempfer, Valentini, and Ingram have noticed it. Sir W. Temple (*Works*, vol. iii.) derived benefit from it in his own case.

64. *b. Fomentations and poultices*, both simple and medicated, have been long advised for gout. Hornung and Riedlin have directed fomentations with an infusion of tobacco, and Kunrath poultices with the leaves of hyoscyamus; but, although they may relieve the pain, they relax and weaken the parts. Alexander Trallianus has stated, that they occasion a chronic state of disease, and favour the formation of concretions. Poppy fomentation, the vapour of hot water impregnated with aromatic herbs, and various emollient herbs and flowers used in the form of poultice, have been recommended. Grüling has advised the application of the infused flowers

of the sambucus; but it is very doubtful whether any of these is truly beneficial. Sir C. Scudamore, however, remarks, that a poultice made with bread, scalded with boiling water, pressed through a strainer to dryness, and then rendered sufficiently soft by the addition of one part of alcohol, and three of camphor mixture, is frequently of service when applied just tepid directly to the affected part, and kept on during the night only. This writer states, that he has employed, with the best success, a lotion composed of one part of alcohol and three of camphor mixture, rendered agreeably lukewarm by the addition of a sufficient quantity of boiling water, and applied by means of linen rags. He remarks, that if the temperature be higher, it is less beneficial; and if it be lower, it is liable to the objections urged against cold applications. — *Warm pediluvia* have been resorted to, but are injurious whilst the inflammation remains. Sir C. Scudamore has seen the symptoms reproduced by their employment at the decline of the paroxysm, and has adduced instances where they caused a metastasis of the local affection. Combed *wool*, and various other applications, made with a view to accumulate the warmth, and promote the perspiration of the part, have been very much resorted to; and I have seen much relief obtained from soft flannel wrung out of warm water, wrapped about the part, and closely covered by oil-skin; but this practice is open to the objections already noticed.

65. *c. Local refrigerants* have received the sanction of Hippocrates, Celsus, Camerarius, Zacutus Lusitanus, Kolhaas, Keck, Vander Heyden, Bartholin, Pechlin, Bergius, Lauzani, Pietsch, and Kinglake. Dr. Heberden states, that the celebrated Harvey applied cold in his own case. Dr. Good followed his example in his early attacks, and whilst the vigour of his constitution was not materially impaired; afterwards, when the disease appeared with more debility and irritability of the system, he judiciously refrained from this practice. In strong persons, the application of cold will afford relief, and it may not be injurious; but in other circumstances, it is hazardous. Marcard, and numerous writers since his time, have shown its bad effects; for, like all other means tending to relieve the local affection, whilst the constitutional disorder remains untouched, it may cause the transition of the disease to some other situation, either external or internal. — The application of *veratria* or of *aconitine* to the part, in the form of ointment, (Veratriæ gr. x—xv.; Adipis præpar. ʒiv.), has been recommended by Dr. Turnbull, but it is liable to the objection just urged. — The leaves of the *Cactus Opuntia* have been used as a poultice, by Paule and Papen; and relief has been derived from the common cabbage leaf. I have seen a steak of raw beef, applied either whilst still warm, or immediately after it was cut from the recently killed animal, produce remarkable relief, and without any consequent inconvenience. It is deserving of further trial. These two latter are popular remedies in some countries.* — External applications of an active kind are generally either of little benefit, or are hazardous, in the nervous or debilitated; in persons liable to painful affections of the stomach and bowels; in those subject to palpitations or irregular action of the heart, or to disorders referrible to the encephalon; and in those complaining of diseases of the lungs, or of asthmatic attacks. — The tepid lotion and poultice advised by Sir C. Scudamore, and liniments of oil of almonds and camphor liniment, or tepid epithems, are, upon the whole, the safest and best.

66. *D.* The *Diet and Regimen during the paroxysm* should be strictly regulated. — In this form of gout, especially, the diet should be spare, cooling, and chiefly farinaceous. Boiled bread and milk are praised by Sir C. Scudamore; but it sometimes produces acidity; which, however, may be prevented or corrected by the admixture of a small quantity of calcined magnesia. Arrow-root, sago, or panada slightly spiced, will generally be sufficient as long as febrile excitement continues; but in nervous, debilitated, or irritable habits, a little Madeira or sherry, or a dessert spoonful of brandy, may be added to these. As the paroxysm subsides in these constitutions, a little light animal food, and an additional allowance of wine, may be permitted, particularly if the patient's previous habits require the indulgence. The best beverage during the fit is tepid whey, which may be taken in any quantity: it aids the operation of the medicines on the bowels and kidneys. A weak infusion of sassafras, weak black tea, thin gruel, barley water, or other diluents, may be also used; but acid drinks should be avoided. Small quantities of the subcarbonate of potash may be added to these, and they may be rendered more agreeable by a few slices of orange or lemon peel. Grapes and ripe oranges may be likewise allowed, if they be not found to occasion flatulency or acidity. A very restricted diet in the fit has been strongly insisted upon by Celsus, Thriverius, Riedlin, Pietsch, and Cadogan, who have justly considered it an important part of the treatment; for, if nourishment be too liberally allowed, or if it be stimulating, from a mistaken notion of supporting the strength, the result will be merely the aggravation of the disease. The patient should not remain in bed for a longer period than is really necessary, but begin to use his limbs gently as soon as possible. Sydenham recommends that he should take exercise in a carriage even in the beginning of a fit; but this is seldom beneficial, and therefore unnecessary. An attack has been

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* The following list of substances, although adduced satirically in the Τϱαγοποδαγϱα of Lucian, was actually employed by the ancients in the external treatment of gout: —

"Terunt plantagines, et apia . . . . .
Et folia lactucarum et sylvestrem portulacam:
Alii marrubium; alii potamogeïtonem;
Alii urticas terunt; alii symphytum;
Alii lentes adferunt ex palustribus lectas;
Alii pastinacam coctam; alii folia persicorum,
Hyoscyamum, papaver, cepas agrestes, mali punici cortices,
Psyllium, thus, radicem ellebori, nitrum,
Fœnum græcum cum vino, gyrinum, collamphacum,
Cyparissinam gallam, pollen hordeaceum,
Brassicæ decoctæ folia, gypsum ex garo,
Stercora montanæ capræ, humanum oletum,
Farinas fabarum, florem asii lapidis:
Coquunt rubetas, mares-araneos, lacertas, feles,
Ranas, hyænas, tragelaphos, vulpeculas.
Quale metallum non exploratum est mortalibus?
Quis non succus? Qualis non arborum lacryma?
Animalium quorumvis ossa, nervi, pelles,
Adeps, sanguis, medulla, stercus, lac.
Bibunt alii numero quaterno pharmacum:
Alii octono; sed septeno plures.
Alius vero bibens hieram purgatur:
Alius incantamentis impostorum deluditur," &c.

prevented by determined exertion, or by a long walk; but it has also been brought on by the same cause. Dr. Small advises the patient to walk abroad as soon as the inflammatory action has ceased, and argues that gouty persons owe their lameness more to indolence and fear of pain than to the disease. Sir C. Scudamore, however, states, that he has seen the too early exertion of the limb produce a relapse. When the pressure of the bed-clothes cannot be borne, the part may be protected by a cradle.

67. *E. Treatment during Convalescence and in the Interval.* — Treatment ought not to be relinquished with the subsidence of the paroxysm, but directed to the restoration of the healthy state of the digestive and excreting functions, and of the strength of the weakened limbs. If these ends be not attained, the patient will be liable either to protracted convalescence, or to the speedy return of the fit. During recovery, the appetite is often in a state of morbid excess, whilst the powers of digestion and assimilation are weakened. This seems to be owing to the vascular erethism of the gastric mucous surface, and requires the restraint of the physician, and the self-control of the patient. The meals should be light, and in moderate quantity. Where there is much debility, half a pint of asses' milk may be taken early in the morning, and repeated at night. Animal food ought to be sparingly indulged in; and soups, pie-crusts, pickles, and pastry of all kinds, avoided, as they generally occasion, in gouty persons, acidity of the prima via. The stomach should not be required to perform more than its strength will admit of, nor goaded to exertion by stimulating or heating beverages. Where there is a tendency to plethora or vascular excitement of the digestive mucous surface, or to congestion of the liver, or to determination to the head, this caution ought to be carefully observed. It will, however, be necessary to restore the organic functions by an appropriate use of bitters or other tonics; but these medicines should either be postponed until the secretions and excretions are restored to a healthy state, or be conjoined or alternated with means directed to fulfil this intention. Whilst the tongue continues loaded, mild purgatives or deobstruent aperients are necessary; but purgatives alone will frequently fail of removing this symptom, and restoring the healthy functions of the abdominal viscera, unless tonics are also exhibited. The state of the tongue, in these cases, frequently depends more upon the constitutional disorder and debility, than upon the state of the alimentary canal. It will, therefore, be preferable to conjoin tonic infusions with such a quantity of the infusion of senna or of rhubarb, as will act moderately on the bowels; and to these, either of the alkaline carbonates and the extract of taraxacum may be added. Craving of the appetite is to be referred to debility, or to the cause already adduced; and will generally be removed by tonics, judiciously combined with alteratives and laxatives.

68. In a large proportion of cases, the treatment during convalescence, and in the interval, should consist chiefly of a restricted diet, abstinence from wine and heating liquors, and a careful regulation of the quantity of food to the degree of physical exertion used by the patient. In tolerably sound constitutions, tonics will merely increase vascular plethora — especially if chalybeates be employed, — unless active exercise be taken, and secretion and excretion be promoted. When there is chronic disease of the liver, or torpor of this organ, or biliary obstruction, mercurial alteratives should be given at bed-time, and an aperient draught with taraxacum early in the morning. The emplastrum ammoniaci cum hydrargyro may also be applied to the right hypochondrium and epigastrium. In nervous, irritable, or debilitated persons, the judicious use of tonics is beneficial. In many cases, the compound decoction of sarsaparilla, the mezereon being omitted, will prove gently tonic as well as alterative; but, when the debility is greater, the sulphate of quinine, or the preparations of bark, are preferable. The infusion or decoction of cinchona, or any of the other tonic infusions, may be prescribed with the alkaline carbonates, and the aromatic spirit of ammonia, and, when the stomach is irritable, with an increased quantity of the carbonates, and taken during effervescence with fresh lemon juice. When the bowels are sluggish, a compound infusion of tonics and aperients may be given in the manner I have just advised; or any of the medicines directed above (§ 50. 56.) may be used; or the compound decoction of aloes may be taken with the compound infusion of gentian, or with the infusion of cascarilla, or with camphor julep, as recommended by Sir C. Scudamore; an alterative pill, consisting of Plummer's pill and soap, or of hydrarg. cum creta, the compound rhubarb pill and soap, being taken at night. — When there is no tendency to inflammatory action or congestion of the liver, debility of the digestive organs, as well as a sluggish state of the bowels, will be remedied by quinine conjoined with small doses of the purified extract of aloes, or with the aloes and myrrh pill, or with the compound rhubarb pill (see F. 575.). The following draught may be used as a stomachic aperient, and varied according to circumstances; or the pills may be substituted, and taken at dinner or at bed time, in a dose sufficient to keep the bowels freely open: —

No. 238. ℞ Corticis Cascarillæ contusi ʒij.; Calumbæ Radicis concisi ʒjss.; Rhei Rad. concisi ℈ij. (vel Folior. Sennæ ʒiij.); Semin. Coriand. contus. et Cardamom. Semin. contrit. āā ʒss.; Aquæ Ferventis ℥ix. Macera per horas duas, et cola.

No. 239. ℞ Hujus Infusi ʒxj.; Potassæ Carbon. ʒss.; Tinct. Aurantii ʒj. M. Fiat Haustus, primo mane, et meridie, cum succi limonis recentis cochleare, in effervescentiæ impetu, sumendus.

No. 240. Pulv. Ipecacuanhæ gr. xij.; Pulv. Capsici ℈j.; Pulv. Rhæi ℈ij.; Extr. Aloës purif. ℈j.; Extr. Fellis Bovini ℈ij.; Saponis Duri ℈j.; Olei Cajeputæ ♏ xx. vel q. s. M. Fiant Pilulæ xl. quarum capiat unam, duas, aut tres, cum prandio, vel horâ somni.

69. The *œdema* and debility of parts consequent on the fit are most marked after a relaxing local treatment, and are frequently such as to require medical aid.—Mechanical support, by means either of a calico or flannel roller, according to the warmth of the season, is generally serviceable, especially if the veins are varicose, or the ligaments weak. The surface of the parts may also be sponged, night and morning, with a strong solution of salt in water, at a tepid temperature; and having been wiped dry, friction should be applied for some time. Frequently, friction should be accompanied by the use of a stimulating and strengthening liniment, consisting of the compound camphor and soap liniments, with the ad-

dition of a little spirits of turpentine and cajeput oil; or *Formulæ* 308. 311. in the Appendix may be employed.

70. *F.* The *Empirical Treatment of Acute Gout* requires merely a brief notice.— *a.* The *eau médicinale*, *Wilson's tincture*, and *Reynold's specific*, are in most general use as specifics for the cure of gout. The composition of these, however, is not certainly known, although it is generally believed that they are preparations of colchicum of different degrees of strength. Their effects are very nearly the same as those of the tincture and wine of the roots of colchicum; for they all produce, in the dose of a drachm or a drachm and a half, diminished energy and frequency of the pulse, languor, nausea, sickness, terminating either in vomiting or in alvine evacuations, and relief of pain. If the dose be the least in excess — especially in some constitutions — syncope, extreme prostration, cold sweats, violent vomiting and purging, a small feeble pulse, and alarming sinking or insensibility, are the results. *Colchicum*, when employed merely with the view of preventing, or suddenly curing, the paroxysm, and without reference to the removal of the morbid conditions of which it is the external manifestation, is liable to the same objections as are justly urged against the above secret medicines. The consequences of having frequent recourse to them vary in different constitutions, and with the habits and modes of living of the patient: but they commonly are — a much more frequent return of the fit, or of the symptoms indicating its approach; impaired nervous power; debility of the digestive organs; torpor or irregularity of the biliary functions and of the bowels; headachs, and a variety of symptoms referrible to the encephalon. — Besides these, I have met with instances of hypochondriasis, melancholy, mental delusions amounting to insanity, paralysis, and angina pectoris, evidently arising from this cause. I very recently saw a case of partial insanity, with Mr. SHUTE, occasioned by the use of Wilson's tincture on the approach of the gouty paroxysm.

71. *Veratrum*, or the white hellebore, or some unknown species of veratrum, was much employed by the ancients in gout; and Mr. MOORE recommended a wine of this plant with laudanum, believing it to be identical with the eau médicinale. Sir C. SCUDAMORE has referred to instances where it produced dangerous effects. It usually causes irritation of the stomach, with a distressing sense of heat, white tongue, thirst, and nervous depression; and, in a larger dose, severe vomiting and purging, with griping pains, and distressing sinking of the vital powers. In the more moderate doses in which it is prescribed, its effects are not so severe, but then it frequently fails of having any control over the symptoms. — The *Gratiola officinalis*, or hedge hyssop, and the *Ranunculus flammula*, have likewise been employed; but they deserve little credit. A tincture of the former, however, has been said to produce effects similar to the eau médicinale. They are both very active irritants of the digestive mucous surface, and produce purgative and emetic effects. — The *Elaterium* has been given by Mr. GREEN, in the infusion of senna, with a few drops of laudanum. It has generally produced slight vomiting, and copious alvine evacuations, and speedily removed the fit. — He recommends flannel, fleecy hosiery, &c. to be laid aside, and leeches to be applied, when much inflammation exists in the affected part. — The *Ballota lanata* has been employed by Professor BRERA in the form of decoction — half an ounce of it being boiled in a pint of water down to half a pint, which quantity is to be taken daily. It appears to promote the secretions and excretions.

72. *Various other active Medicines* have been employed with the view of removing the fit. Some of these are extremely powerful, and require much caution; others have little influence. The *Rhododendron chrysanthum* has been prescribed by HOFFMANN, KOELPIN, BUZOW, PALLAS, WEISMANTEL, and METTERNICH. It is used principally in the northern countries of Europe; and, when carefully exhibited, is a medicine of no mean efficacy, especially in the more chronic states of the disease. The decoction of *Solanum dulcamara* has been recommended by CARRÈRE, WANTERS, and PRESSAVIN; the decoction of the *Sambucus*, by FREITAG, BLOCHWITZ, and GARDANE; the *Erigeron Philadelphicum*, by BARTON; *Digitalis*, by HOFFMANN and GAPPER: the decoction of the *Ilex aquifolium*, by FRIZE, REIL, DREYSIG, and BANDELOW; and the decoction of the *Hedera terrestris*, by DE HEIDE and CARTHEUSER. Of these, the *sambucus* seems most deserving of use, the berries and bark being the most active parts.

73. The above substances act energetically upon the digestive mucous surface, and promote the secretions and excretions; but, when exhibited in large doses, they also inflame this surface, impair the organic nervous energy, powerfully affect the brain and the rest of the cerebro-spinal system, and lower the sensibility. They should, therefore, be given with great discrimination and caution. Where the powers of the constitution are materially weakened, and the organs of digestion in a state of irritation, they ought not to be employed. Their influence on the paroxysm is chiefly to be attributed to the above modes of operation — to the copious evacuations they procure from both the liver and digestive mucous surface—and partly to their action on the nervous system.

74. *b.* The *Portland gout powder* once had great reputation for preventing the return of the fit. It consists of the roots of birthwort, and of gentian, and of the tops and leaves of germander, ground-pine, and centaury. These are well dried, powdered, and sifted, and mixed together in equal weights; a drachm being taken every morning fasting. Dr. CLEPHANE has instituted a learned inquiry into the origin and use of this powder. Having continued this quantity for three months, a dose of three fourths of a drachm is given for another three months, and half a drachm afterwards for six months. This medicine differs but little from some mentioned by GALEN, CÆLIUS AURELIANUS, AËTIUS, and others of the ancients; and which appear to have been brought into notice for a time, and then to have fallen into neglect, owing to their pernicious influence. Indeed, CÆLIUS AURELIANUS remarks, that he has seen gouty persons, who frequently used bitters, carried off by apoplexy; and the same remark is made by BOERHAAVE and QUARIN. Dr. CULLEN states, that where the Portland powder has been long used, the external manifestation of gout was not ob-

served; but symptoms of atonic gout, or apoplexy, or asthma, or dropsy, supervened. He remarks, that the prevention of the disease depends much on supporting the tone of the stomach, and avoiding indigestion; that costiveness, by occasioning this latter, is hurtful and should be avoided; and that much purging is injurious.—The aperients he recommends are, aloes, rhubarb, magnesia, and precipitated sulphur, as they may suit particular cases.—*Sulphur* is recommended for the prevention of the fit by TULPIUS, RULAND, GRANT, GARDINER, and QUARIN. HUFELAND advises it to be conjoined with guaiacum, in a quantity sufficient to act moderately on the bowels. There is no doubt of sulphur and magnesia being both safe and efficacious, in preventing the return of the disease, when aided by suitable diet and regimen.

75. c. *Chalybeates* have been considered as extremely efficacious in preventing the fit, especially when conjoined with the alkaline subcarbonates, and when the bowels are kept open during their use. The preparations of hop are also of service; but they require, equally with chalybeates, quinine, and other tonics, an abstemious and temperate diet, and exercise in the open air. Of tonic, stimulating, and heating medicines, given with the view of preventing the paroxysm, it may be stated, that they are dangerous in the plethoric and robust, inasmuch as they increase vascular fulness and action; and that, if they be resorted to, in such persons especially, abstinence, and the free action of all the emunctories, should be observed. In some cases — particularly in nervous, irritable, and delicate constitutions — a moderate quantity of wine, or either of the tonics in most common use, as the preparations of cinchona, or of the aromatic or bitter substances, or of iron, or of hop, &c., is almost indispensable; but the use of purgatives and the rest of the treatment should also be enforced.

76. ii. *Treatment of Chronic Gout.* — This state of disease has been shown to occur either primarily, or consecutively on the acute. — *A. In the former case*, the powers of the constitution are insufficient to produce the disease in a sthenic form; and either the nervous, or the lymphatic, or phlegmatic temperament, is generally predominant. The *indications* of cure should be founded upon a careful estimate of the condition of the several functions, especially those concerned in excretion. Vascular plethora is seldom present in such a degree as to require general depletion. The imperfect performance of the digestive, assimilating, and excreting functions, and defective nervous power, indicate the employment of medicines calculated to increase these functions. When the biliary secretions are scanty or obstructed, a full dose of calomel, of camphor, or JAMES's powder, and hyoscyamus, may be given at bed-time, and a purgative draught at an early hour in the morning. To these may be added, during the day, saline, aperient, and diuretic medicines, with an alkali, or magnesia. It will frequently be necessary to soothe nervous irritation by the exhibition of a narcotic. The preparations of opium, especially DOVER's powder, or morphine conjoined with camphor or aromatics, will generally give relief, especially after morbid secretions and excrementitious matters are evacuated. But they constipate the bowels; the other narcotics may therefore be tried. It will, however, be found frequently preferable to continue the opiate, and to obviate its effects by one of the stomachic aperients prescribed above, taken early each morning.

77. Tonics, and heating or stimulating medicines, tend rather to fix than to remove the disease; and are always injurious, if excrementitious matters have not been carried off. An alterative and aperient pill, as the hydrargyrum cum creta, Castile soap, and extract of taraxacum; or PLUMMER's pill, with either of the same adjuncts; may be taken at bed-time, and a small or moderate dose of any of the preparations of colchicum in the morning and at mid-day, with any of the stomachic aperients as prescribed above (§ 50. 68.).—In this form of the disease especially, the spiritus colchici ammoniatus is a useful medicine. But either of the other preparations may be used, conjoined with magnesia, or with any of the alkaline subcarbonates, and with saline or stomachic aperients. Sir C. SCUDAMORE recommends a draught with compound tincture of benzoin and magnesia to be given once or twice a day, or the compound decoction of aloes, with an equal proportion of the infusion of cascarilla or of gentian. When the secretions are restored to a healthy state, and debility of stomach with general depression is the principal ailment, gentle tonics, aided by suitable diet, and moderate exercise in the open air, are necessary; but a too full and stimulating diet, or heating regimen, should be avoided. In the summer and autumn, the warm sea bath, twice or thrice a week, will be serviceable.

78. *B. Chronic gout consequent upon the acute*, especially after repeated invasions of the latter have impaired the constitutional powers, is generally attended by obstinate disorder of the digestive and excreting functions, with more or less disturbance of the nervous system. Vascular plethora is oftener present in this variety of chronic gout, than in the preceding; and the local affection is readily increased by the internal use of stimulants; but alterative aperients, conjoined with colchicum and diuretics, as just recommended (§ 77.), will generally be efficacious. When the bowels are very torpid, the purgatives mentioned above (§ 50. 54. 56.) should be given in such doses as may be sufficient. Sir C. SCUDAMORE advises the addition of guaiacum to the purgative in such cases; and, when little or no fever is present, it will prove beneficial. If congestion exist in the liver, head, or kidneys, cupping will be necessary. When pain in the stomach, or tenderness in the epigastrium, is complained of, leeches applied on this region, and followed by a rubefacient epithem, or blister, will be requisite. If the urine be scanty, high-coloured, and thick, cupping over the kidneys, and the use of active diuretics, will be of great service. Besides the saline substances already noticed, small doses of turpentine, or a decoction or infusion of the pine sprouts or tops, as directed by BARTHEZ, may be given at short intervals; or the preparations of juniper, or the sweet spirits of nitre, may be added to saline and alkaline medicines. When the liver continues torpid, or the bile deficient, and the urine thick, the compound calomel pill, with soap, should be given at night, and the extract of taraxacum added to the medicine prescribed during the day.

79. Having removed the more urgent phenomena, the treatment should be directed to the restoration of the healthy actions of the emunctories, and of the digestive organs, as insisted on with reference to the other states of the disease.— But unless an abstemious diet and temperate regimen be observed, and be aided by regular exercise in the open air, disorder of these organs will soon return, and the gouty affection afterwards reappear.—When the nervous system has become very susceptible, and the parts affected more or less changed in structure, the object, after the removal of the internal disorder, is to invigorate the nervous system, and restore the parts as far as possible to the healthy state. Unless this end be accomplished, so as to allow the patient to take sufficient exercise, recurrence of the disease can hardly be prevented; and, although the digestive and excreting functions may be preserved in a healthy state, the affection will assume more or less of a rheumatic character; or rheumatism will be associated with it; and the patient will be injuriously impressed by every change of weather, and by every exposure. Where this state of disorder occurs, small doses of DOVER's powder, either alone or with camphor, and a judicious recourse to aperients with tonics, will prove beneficial. *Sulphur*, either alone or with guaiacum, as recommended by HUFELAND; and the compound decoction of sarsaparilla, with the *liquor potassæ*, or with *hydriodate of potash*, or with both, aided by the external applications about to be mentioned, will also be serviceable in these cases.

80. *C.* The *local treatment in chronic gout* should claim attention as soon as the more urgent disorder subsides.—*a.* The vapour bath frequently increases the weakness of the parts; but sponging the surface with a strong tepid solution of salt in water, is often of service.—*Frictions* with slightly stimulating liniments, as the compound camphor, and compound soap, liniments conjoined, are generally beneficial; and to these may be added, in the more indolent cases, spirits of turpentine and cajeput oil. Frequent or continued frictions are of the greatest benefit, and should be employed in the intervals between the use of liniments. When œdema remains, and the sensibility of the parts has subsided, the tincture of *iodine* may be applied over the surface with a camel-hair pencil. — *Electricity*, especially sparks drawn from the part, has been advised in such cases by QUELMALZ, NEIFELD, SCHAEFFER, BAUMER, DE HAEN, VOGEL, and SIGAUD LA FOND; and *galvanism*, by WALTHER and BISCHOFF. Of the efficacy of these, however, I can give no opinion. Suitable support of the parts by bandages, or by laced stockings, is generally of service. Of the use of mineral baths, &c., mention will be made in the sequel. But whatever external means are employed, ought to be preceded and accompanied by internal treatment, otherwise little permanent advantage will accrue; or even the external affection may be thereby merely suppressed, and internal disease either produced or increased.

81. *b.* The *gouty concretions* are seldom removed even by the aid of external treatment. Mr. MOORE states, that pressure ought not to be applied to them; and that their removal by the knife should not be attempted. He, however, admits that a small puncture of the cuticle may be made, and that caustic may be applied when they have penetrated the cutis. The application of cajeput oil was recommended by HUFELAND and ABRAHAMSON; but it is more advantageously used with the spirits of turpentine and the compound soap liniment. J. P. FRANK advises soaps rendered emollient in almond or other oils, with the addition of camphor. Sir C. SCUDAMORE directs the liquor potassæ, diluted by an equal quantity of almond milk, to be rubbed over the part twice or thrice daily; and calcined magnesia and liquor potassæ to be given internally in almond emulsion, or in any other vehicle suggested by the state of the internal functions. It is necessary, however, that this plan should be persevered in, and that the functions of the stomach and liver should receive strict attention. Regular exercise in the open air ought also be taken, as advised by SYDENHAM, and found beneficial in his own case.

82. iii. *Treatment of Irregular Gout.*—I have shown above, that gouty affections may be irregular in three different ways.—(*a*) The precursory disorder may be of an irregular, prolonged, or unusual character, and ultimately be followed by the external affection;—(*b*) or the disease may commence in its usual manner, suddenly disappear, and affect some internal viscus;—(*c*) or it may seize at once upon some internal organ, and either exhaust itself, or be remedied by treatment without any external affection appearing in its course, or it may destroy the patient.—The *first* and *third* of these varieties require the same treatment, modified according to the character and seat of the internal affection. I shall therefore consider, in the first place, the means most appropriate to the disorders connected with the retrocession or suppression of the external affection.

83. *A. Retrocedent Gout.*—In no disease is discrimination, on the part of the physician, more necessary than in this; for upon the inference that is formed as to the existence of inflammation or of spasm, and as to the degree in which either is present, the life of the patient depends. — *a.* In nervous and weak constitutions, a *spasmodic* or *nervous character* is generally predominant, as indicated by the weak, or irregular, or unaccelerated pulse, and by the ease derived from pressure, &c. In these, energetic stimulants or antispasmodics, with anodynes or narcotics, or even warm brandy and water, are required. In other cases, a mixed affection, or a state of congestion, may be inferred; and in them, the remedies just mentioned may not be injurious, but additional means are required, especially alvine evacuations, external derivatives, or even local depletions. When the retrocession appears to have been caused by indigestible matters, an emetic should be exhibited, conjoined with a warm cardiac, as capsicum, ammonia, or camphor; and if nausea and vomiting be present, a full operation should be procured by warm water, or by the infusion of chamomile flowers. If the stomach or bowels are principally affected, a full dose of calomel, with camphor, hyoscyamus, or opium, should be given; and, two or three hours afterwards, one of the purgative draughts already prescribed, which should be aided in its operation by a cathartic enema containing turpentine, assafœtida, or camphor. — If suffering

still continue, the calomel, camphor, and opium may be repeated, after an interval short in proportion to the severity of the case; the feet should be plunged in hot water to which a large quantity of mustard flour and salt are added, or be enveloped in sinapisms; and flannels wrung out of very hot water, and soaked with spirits of turpentine, should be applied over the abdomen; or croton oil rubbed over the stomach. Sir C. Scudamore directs the saline draught with colchicum to be given and repeated; but I doubt the propriety of giving this medicine in cases of consecutive gouty affection of the stomach or intestines.

84. *b.* Although the internal affection will often assume a nervous or spasmodic character — especially in the constitutions mentioned in connection with it, and at the commencement of the seizure, before vascular reaction has taken place — yet *active congestion* or *inflammatory determination* is not infrequent, particularly in more plethoric and irritable habits. — Much care and discrimination are required to ascertain the presence or absence of these states; and either is to be inferred chiefly from the causes of retrocession, from the state of the pulse and of vascular repletion, and from the tenderness, fulness, or tension, and temperature, of the regions containing the affected organ. The patient's sensations, and the symptoms connected with the excreting functions, ought also to be carefully estimated If, from these, *inflammatory action* of the stomach, intestines or kidneys be inferred, bloodletting, according to the strength and habit of body of the patient, must be promptly put in practice. But vascular depletions are neither so well borne in such cases, nor so successful, as for inflammations occurring primarily, or in previously healthy persons. The amount and repetition of depletion must depend entirely upon the circumstances of the case; but, in every instance, depletion should be aided by the derivatives and hot epithems just recommended. A full dose of calomel, with a few grains of camphor, and two of opium, should also be administered, and repeated within two or three hours, if indications of relief are not observed. After one general bloodletting, local depletion by cupping or leeches may be employed, and repeated in severe cases, or in plethoric persons. In some instances, the powers of the circulation can bear only local depletions. — When much flatulent distension, and severe colicky pains, either attend the internal seizure, or remain after the above means are employed, equal parts of oil and turpentine and of castor oil (ʒiv. to ʒvj. of each) may be given on the surface of an aromatic water, with or without a warm tincture, or aromatic spirit; and an enema containing the same oil may be administered a few hours afterwards, to promote its operation.

85. *c.* The internal attack, although nervous or spasmodic at its commencement, may become congestive, or even inflammatory, as vascular reaction supervenes. This fact should not be overlooked; for the seizure that is benefited by stimulants at the beginning, owing to this circumstance, may require depletions in its progress. The internal affection may even present a *mixed character* — one in which it is difficult to determine whether the nervous, or the spasmodic, or the congestive, or the inflammatory symptoms predominate. In these cases, it will be necessary to have recourse to antispasmodics and narcotics or anodynes, whilst vascular depletions and evacuations are being employed. — Having treated several cases of retrocedent gout, and being thereby induced to observe closely, and to reflect upon, the phenomena attending it, and the effects of the treatment adopted, I am morally convinced, that exclusive views as to either the nervous or the inflammatory character of the internal affections, are incorrect; and that it requires the utmost acumen on the part of the practitioner to discriminate between these states, and to detect their varying shades. In the more spasmodic forms of these affections, especially when implicating the stomach, opium and camphor are most valuable remedies; but I have seen great benefit also accrue from hydrocyanic acid given in repeated doses with camphor and aromatics.

86. *d.* When the consecutive seizure is experienced in the *heart* or *lungs*, the same principle of practice should be observed. When the *heart* is affected, the restlessness, anxiety at the præcordia, and alarm of the patient, are most distressing. I have lately seen two cases of this kind. In both, the action of this organ was frequent, irregular, fluttering and weak; in one, it intermitted every fourth beat, the three intervening strokes being successively weaker. In both these I am convinced, from the character of the symptoms, that depletions would have caused a fatal result. Camphor and opium, with aromatics and external derivatives, were prescribed for both, and in a few hours the affection was removed. In the cases also referred to above (§ 19.), this and similar modes of practice were equally beneficial.

87. *e.* When *apoplectic*, *epileptic*, or *convulsive* seizures follow the retrocession of gout, vascular depletion is frequently requisite, especially in apoplexy. But, even in it, discrimination is imperatively called for. If the head be cool, and the action of the carotids weak, an entirely opposite treatment to depletion is required.— In the *epileptic* or *convulsive seizures*, depletions are often unnecessary, and sometimes injurious. Even when manifestly indicated, they require much caution, and ought not to be prescribed in large quantity. In both the apoplectic and epileptic attacks, purgatives, and cathartic enemata, energetic derivation to the lower extremities, and camphor, are beneficial; but narcotics should be withheld, especially in the former, although, when conjoined with antispasmodics and cardiacs, they are sometimes of service.— When the retrocession of gout has been caused by cold, vascular depletion is more frequently useful, than in other circumstances; but the utmost caution is necessary as to the extent to which it is carried. Derivations by sinapisms, mustard pediluvia, croton oil, &c., however, ought to be most actively employed.

88. *f.* If the *kidneys* or neck of the *bladder* are affected upon the retrocession of gout, the treatment will depend entirely upon the concomitant phenomena. If the urine be suppressed, or pain or tenderness be felt in the region of the kidneys, or numbness in one or both thighs, cupping on the loins, followed by a blister in the same situation, will be requisite; but the latter should be removed after a few hours, or sinapisms substituted. — Derivation to the lower extremities, and small doses of camphor internally, with diuretics,

ought also to be prescribed.— Where the neck of the bladder becomes affected, leeches applied to the perineum, the semicupium, and the internal use of alkalies, with camphor and anodynes, or with mucilaginous and diuretic medicines, should be employed.

89. *B. Misplaced Gout* (§ 21.), or those severe affections of internal organs which threaten the life of the patient, and are either followed by the regular disease, or run their course without any external affection, although occurring in persons who have previously had gout, must be treated very nearly according to the principles stated above. If vascular depletion require cautious discrimination in retrocedent gout, it still more imperiously demands it in cases of this kind. — *a.* Any internal organ may be the seat of misplaced gout, or in other words, the internal viscera are disposed to severe disorder in gouty constitutions; but the stomach, bowels, heart, brain, and kidneys are most frequently affected. Gouty persons are often affected by spasms of the stomach and colic, after exposure to cold, or after partaking of cold, acid, or improper food. For these cases, large draughts of warm water, and stimulant and cardiac medicines, or warm brandy and water, are suitable means. In some, the disorder alternates between the *stomach* and *heart;* or the flatulence attending upon the affection of the former, induces palpitation or otherwise disordered action of the latter, with inexpressible anxiety. A gentleman who had suffered attacks of gout, but had escaped them for some years, was subject to disorder of the stomach, to severe headachs, and to alarming and sudden affections of the heart, the action of which was fluttering or tumultuous; and the anxiety and suffering referrible to it, most distressing. He was lately seized with one of these attacks at a party. He was assisted into his carriage, and was brought to my house after midnight. The affection approached the characters of angina pectoris, but I inferred its aggravation by flatulence: I therefore prescribed a warm carminative medicine. Whilst this was being procured, I directed the patient to swallow a few of the small pods of capsicum. Flatulent eructations and instant relief were the consequences. In a few minutes afterwards he walked unaided to his carriage.

90. A gentleman well known in the profession had some years ago experienced imperfect manifestations of gout in the lower extremities, connected with affection of the digestive organs. Recently after a severe domestic affliction, he was seized with distressing disorder of the stomach and heart, with anxiety, alarm, and nervous irritation. Dr. Roots and myself agreed as to its nature; and prescribed anodynes with antispasmodics, aromatics, and alkaline subcarbonates. The excretions received due attention, and external derivatives (§ 83.) were employed. Whilst improving under this treatment, he was suddenly affected by an alarming increase of the disorder of the heart. His pulse had become weak, irritable, and intermitting; the impulse of the heart was feeble, but unaccompanied by any anormal sound; his countenance was expressive of distress; and he was constantly changing his position. A draught, containing two drops of hydrocyanic acid with camphor, aromatics, and capsicum, was prescribed, and repeated in an hour, and derivations by sinapisms resorted to. He obtained relief in a few hours, and continued improving for two or three weeks afterwards; when he had a second attack in the night, for which camphor and ammonia, with opium, were given him, and carminatives with magnesia. He was immediately relieved, and has continued afterwards to improve; the subsequent treatment consisting of a combination of anodynes and restoratives, and of stomachic aperients.

91. *b.* When apoplectic or epileptic seizures, or diseases of the kidneys or bladder, thus occur in persons who have previously had fits of gout, the treatment should be guided according to the principles just developed. — *Apoplectic* and *paralytic attacks* are very common in gouty persons far advanced in life, and who have been long without a regular paroxysm. In these, depletions are not so generally beneficial as in other circumstances, although they are often required; the energetic exhibition of purgatives and of cathartic enemata, and the application of sinapisms to the feet, &c., being much more generally appropriate. — When *epilepsy* or *convulsions* appear in gouty persons, depletions are hazardous; antispasmodic and purgative enemata and derivation being much more useful. Whatever organ becomes diseased in such persons, the treatment must be guided by the state of the pulse, the signs indicating the nature of the complaint, and the age and strength of the patient; for although large depletions may be necessary in some cases, yet they will certainly destroy the patients in others, although the disorder and its seat are apparently the same. When the disease presents unequivocally inflammatory characters, or when the patient has been highly fed, or is plethoric and robust, bloodletting cannot be dispensed with; the question being, as to the extent to which it should be carried; and, as to this, the practitioner must decide for himself, and be guided by the peculiarities of the case. In the gouty constitution especially, it cannot be trusted to alone, or even principally, unless in robust and plethoric persons.— When apoplexy is *complicated* with gout, the former occurring during the paroxysm, or without the disappearance of the latter, bloodletting and alvine evacuations should be prescribed with an energy suitable to the circumstances just adverted to. Such cases are, however, comparatively rare.—I have never known of an instance of epilepsy whilst the gouty paroxysm continued, although I have seen it take place upon the retrocession of the fit, and in gouty persons. Van Swieten remarks, that, in cases in which he has seen an epileptic seizure in the gouty, the occurrence of a regular paroxysm of gout has prevented a return of the epilepsy.

92. *c.* As to the employment of *colchicum* in cases of retrocedent or misplaced gout, recent writers have stated nothing in which the practitioner can confide. When the stomach is weak, the nervous power depressed, and the pulse irritable, it is generally injurious: when inflammatory seizures occur, either upon the sudden disappearance of the external affection, or in the gouty constitution, it may be employed: and the advantage proceeding from it will be in proportion to the degree of sthenic action indicated by the pulse. Yet cases will sometimes occur, in which this medicine cannot be endured, although indi-

cations of vascular fulness and of increased action are present. A gentleman of regular habits, and of a full and large make, had the consequences of chronic gout in his lower extremities, but had not experienced a regular paroxysm for some years. My attendance was required on account of determination of blood to the head. The excretions were free, bilious, and natural. Desirous of removing the disorder by active alvine evacuations, I conjoined small doses of colchicum with the purgatives; but they occasioned a distressing sense of sinking at the epigastrium, and nausea. I soon afterwards found that depletion could not be dispensed with; and nearly thirty ounces of blood were taken from the nape by cupping, without any tendency to syncope; and he soon recovered.—In all cases of doubt, this medicine should be prescribed in small doses, which may be increased; but, as with digitalis, an accumulating effect may result; and it ought to be carefully watched. When, however, increased vascular action exists, in the irregular forms of the disease, it may be cautiously used.

93. Dr. Barlow remarks, "that the complex conditions and alleged varieties of gout are referrible not intrinsically to gout, but to the state of constitution in which it occurs." This is all that is meant; for no modern pathologist intends to convey any other idea than that internal affections supervening in that state of constitution which occasions gout, are generally more or less modified by this circumstance. It is to the improvement of this state of constitution, that treatment should be directed; and, after arriving at rational inferences as to its nature, the means of cure will readily suggest themselves. — Having seen that the constitution or diathesis, which has been called gouty, in order to prevent circumlocution, consists in debility associated with imperfect secretion and excretion, and consequently with fulness of blood or with redundancy of excrementitious matters — the ultimate products of assimilation in the circulation — the treatment should obviously be directed with reference to the predominance of either of these states. Although what has generally been called misplaced gout, may thus be viewed as internal affections occurring in the gouty diathesis, and although they sometimes present little deviation from those appearing in other circumstances, yet a very remarkable difference is often observed — the symptoms being very different, and often peculiar, and the juvantia and lædentia being also different.—The predominance of debility and spasm in many of these affections induced Sprengel, Cullen, and Schmidtmann to prescribe *musk* for them; and the success of the treatment is a presumption of the justness of their views, at least in respect of the cases in which it was employed. — In addition to other stimulants and antispasmodics successfully resorted to in similar circumstances, most of which have been noticed above, I may state, that a solution of *phosphorus* in ether has been advised by Trampel and Hufeland; *aconitum* and *nux vomica*, by Stoerck, myself, and others; the spirits of *turpentine*, by Theodosius and Good; and large doses of *olive oil*, by Brefald, Marino, and Malacarne. If turpentine, however, be resorted to, castor or olive oil should be given with it, in a quantity sufficient to produce a full operation on the bowels; and the same combination ought to be administered as an enema, in order to promote this effect. Neither of these substances, however, nor camphor, ammonia, ether, opium, nor any of the other stimulants and antispasmodics previously mentioned, should be confided in alone, or unaided by active and persevering external derivation.

94. iv. *Of Mineral and Thermal Waters in Gout.* — Mineral waters are beneficial — 1st, by preventing a return of the paroxysm; 2dly, in cases of a tonic and misplaced gout, by giving tone to the digestive and assimilating functions, and thereby either removing the internal affection, or enabling the system to develope the disease in the extremities. — *a*. Respecting the *Bath waters*, Dr. Barlow makes several very judicious observations. In gouty cases, he remarks, especially where the stomach is very weak, and requires some substitute for the wine and stimulants relinquished, the Bath waters give tone to the stomach, improve appetite, and renovate strength. They thus accomplish unequivocal good, not by the mere establishment of gout in the extremities, but by reducing it to its simpler and more manageable state through the amendment effected in the general health. In general, it may be inferred, from what has been written on Bath waters in gout by Falconer, Gibbes, Barlow, and Scudamore, that they are either injurious or of little service, where plethora, disease of the liver, or determination to the head exists, and that these states should be removed before they are resorted to; but that they are of service in debilitated, nervous, and irritable habits; and for those anomalous or internal affections frequently attacking gouty constitutions. When these affections occur in weak and nervous persons, and are unconnected with plethora, or active visceral disease, the internal and external uses of these waters are beneficial, especially if due attention be paid to the excreting functions.—When gout has debilitated the limbs, and weakened the constitution, so that the nervous system is depressed, and the circulation languid, a course of warm sea-bathing, with frictions of the weakened limbs, and sea air, may be tried, or may precede the use of the waters of Bath or Buxton.—Where swellings are seated in the vicinity of the joints, the Buxton baths, or pumping of the Buxton waters on the affected parts, are generally serviceable, especially if proper friction and shampooing be used immediately afterwards.—*b*. Sir C. Scudamore observes that the waters of *Cheltenham* prove highly beneficial to gouty persons, particularly when conjoined with alteratives and proper regimen. When the precursory symptoms are tedious, or assume the form of what is usually called misplaced gout, their stimulating properties often excite a paroxysm, but it is generally slight. The water No. 4. seems most suitable to gouty patients, especially at the commencement of a course of these waters. —*c*. The waters of *Leamington* and *Harrowgate* are not much inferior to those of Cheltenham, when they act sufficiently on the bowels, or when their operation is aided by aperients. They seem, however, in the circumstances just alluded to, to have considerable influence in exciting a fit of the disease.

95. *d*. The *artificial mineral waters* at Brighton, especially the *Seidschutz*, the *Marienbad*, the *Ems*, and *Carlsbad* waters, may also be employed

in the more chronic or misplaced states of the disease.—The waters of *Wiesbaden* are much used, both internally and externally, in atonic or misplaced gout, as well as others of the *Nassau* springs; but they are not superior to the mineral waters of our own country. — *e.* Piso, Zecchius, Baglivi, and Saunders consider the warm mineral waters recommended in gout as little superior to common pump water heated to the same temperature. They advise from half a pint to a pint of common water, of a temperature from 90° to 114°, to be taken, and succeeded by moderate exercise every morning before breakfast. Dr. Saunders states that, in anomalous gout, it allays the irritation of the stomach, and diffuses a generous warmth in the extremities; and that, if taken at night, it conduces to sleep.

96. v. The *Prevention of Gout* consists chiefly in the careful avoidance of the predisposing and exciting causes, and of acidity of the *primæ via.* An abstemious diet, and a small quantity of animal food, are requisite. Some writers, as Stark, Redi, and Lobb, recommend the adoption of vegetable food only; but this restriction is not necessary. Temperance is equally important: unless it be strictly observed, no other means of prevention will be permanently of service. Regular exercise on foot, or on horseback, so as to promote the excretions, is likewise beneficial. Moderation of all the passions and affections of the mind, and avoidance of too intense or prolonged mental application, have been insisted on by most writers; the latter especially by Sydenham and Good. If abstinence, however, be adhered to, and moderate exercise be taken, mental application is seldom injurious. — Flannel clothing next the skin, by promoting the excreting function of this surface, is very serviceable. All vicissitudes of temperature, and exposure to cold, wet, humidity, or changeable weather, ought to be avoided. The feet should be kept dry and warm; and, with the legs and knees, be sponged every morning, as advised by Sir C. Scudamore, with a strong solution of salt in water, of a tepid or slightly warm temperature. If the limbs be weak, pained, or the parts thickened, frictions may be afterwards used. Dessault directs the limbs to be well rubbed night and morning with the hands covered with strong worsted gloves, and states, that a man at seventy had gout; was cured, and remained free from it ever after, owing to this practice, although he lived to 100 years. Sir W. Temple says, that no man need have gout, who can keep a slave to rub him. Cold bathing is hazardous for gouty persons, unless active frictions be employed immediately afterwards; but tepid or warm salt-water bathing is useful. Of the kind of food most serviceable in gouty cases, little further need be stated, than that the easiest digested is the best. Rich dishes and sauces, acids and pickles, pastry, heavy puddings, much butter, and the richer kinds of fish, as salmon, &c., should be shunned.

97. The medical means of prevention have already been noticed (§ 67.). They consist chiefly of medicines calculated to promote the secretions and excretions, and restore nervous energy. Means producing this latter effect only are injurious if they be not conjoined, or alternated, with those causing the former.—Magnesia has been much employed as a prophylactic, and is amongst the medicines that can be employed, either alone or with rhubarb. Its daily use has been dreaded, since Mr. Brande published the accounts of two cases, in which it formed concretions with the mucus of the intestines. But this occurrence is very rare; and, if more active purgatives be occasionally employed, not likely to occur. Lime water and the alkalies have also been prescribed as prophylactics; but the alkalies, when continued long, weaken the stomach and relax the digestive mucous surface. The use of a dinner pill such as I have directed above (§ 68.), or prescribed in the *Appendix* (F. 562.), is more safe, and is generally beneficial.

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GRAVEL. See Urine, &c.

HÆMORRHAGE. — Syn. Αἱμοῤῥαγια (from αἷμα, blood, and ῥήγνυμι, I break forth), Αἱμοῤῥοια (from αἷμα, and ῥέω, I flow), Gr. — *Sanguinis Profluvium*, *Sanguifluxus*, Auct. Latin. *Hæmorrhagia*, Sauvages, Cullen, &c. *Hæmorrhœa*, Swediaur, &c. *Cauma Hæmorrhagicum*, Young. *Profusio*, Linnæus. *Hémorrhagie*, *Flux de Sang*, Fr. *Das Bluten*, *Blutfluss*, Germ. *Emorragie*, *Flusso di Sangue*, Ital. *Hæmorrhagy*, *Bleeding*.

Classif. — 1. *Class*, Febrile Diseases; 4. *Order*, Hæmorrhages (*Cullen*). 3. *Class*, Sanguineous Diseases; 4. *Order*, Cachexies (*Good*). II. Class, III. Order (*Author*, in *Preface*).

1. Defin. — *The discharge or escape of blood from the vessels or channels in which it circulates in the healthy state of the body.*

2. *Hæmorrhage* may take place from the heart, the arteries, the capillaries, or veins, in consequence of disease or of external injury. It may proceed from the capillaries without any obvious lesion, excepting an almost inappreciable dilatation of them; or from the vessels formed in adventitious productions, as from fungoid, carcinomatous, and erectile tumours. It is more or less intimately connected with, and even dependent upon, the state of vital power and of vascular action, and upon local or general plethora, especially when proceeding from capillary vessels.

3. Although the definition given above comprises all the various kinds of hæmorrhage, yet I will confine myself to the consideration of those states of it which fall more especially under the cognisance of the physician. Whenever the red particles of the blood escape from the vessels to any very evident amount, hæmorrhage may be said to exist: and this inference is admissible in whatever situation the extravasation takes place — whether on mucous or serous surfaces, in the parenchyma of organs, or in any of the compound structures of the frame. All parts of the body may become the seats of hæmorrhage, excepting those which are extremely dense, as the bones, cartilages, ligaments, tendons, &c.

4. Although hæmorrhage may take place from any part of the circulating system in consequence of injury or of disease, yet it oftenest proceeds from the minute vessels distributed in mucous or serous membranes, or in the parenchyma of organs, as an exhalation or exudation from their extremities or pores. Before the time of Morgagni, as M. Chomel has remarked, it was ascribed to the rupture of a blood-vessel; and the same doctrine was very generally received until Bichat and Laennec confirmed the views of this celebrated pathologist. Cases, however, often are met with, in which it is very difficult to determine whether the hæmorrhage proceeds from exhalation or from a ruptured or diseased vessel; and, even on inspection after death, the most intimate examination is requisite to the ascertaining of its source.

5. The discharge of blood from capillary vessels, in the form of exhalation or exudation, has been very generally viewed as depending upon a state of those vessels different from that which constitutes inflammation. This doctrine has been recently controverted, particularly by Lefebvre and Broussais; and the following points, in which hæmorrhage closely resembles inflamma-

tion, have been adduced in proof of their very intimate connection, if not of their identity: they both very frequently arise from the same predisposing and exciting causes; both are idiopathic or primary, and symptomatic or consecutive; both are either sthenic or asthenic, acute or chronic, active or passive; they both affect chiefly the same organs; and both require the same treatment. Notwithstanding these resemblances, hæmorrhage is far from being the same disease as inflammation, as will appear in the sequel (§ 13. 15.).

6. In a great majority of instances, hæmorrhage is merely a symptom, contingent upon a variety of affections, the primary ailment being chiefly important to the physician. This is the case, no less when it takes place as an exhalation from mucous surfaces, as when it occurs from disease of the vessels, or into serous cavities, or the parenchyma of organs. — If we enter into an analysis of the pathological relations of hæmorrhages, we shall find that, in comparatively few cases, are they strictly primary or *idiopathic*. This term, therefore, must have a relative acceptation as regards them. Even when proceeding from the capillaries of mucous surfaces, and when perfectly independent of organic lesion of the vessels or of that surface, hæmorrhage is a consequence of antecedent changes; and it is indispensable to the due consideration of the subject, that the nature of these changes should be understood. They may be referred to four general heads; namely — 1st. To the states of organic nervous power and vital action; — 2d. To the state of structure in which the hæmorrhage takes place; — 3d. To the state of the circulating organs and vessels; — 4th. To the conditions of the blood; — and, 5th. To any two or more of these conjoined.

7. i. *Of the States of Organic Nervous Power, or Tone, and of Vascular Action, in Hæmorrhages.* — Although nervous power may be either excited or depressed in the seat of hæmorrhage, it is rarely the former, even when vascular action is increased, unless an irregular distribution or determination of it to the part take place, from its suppression in some other situation, or from local irritation. Vascular action, however, is much more frequently increased than depressed, not only in the part, but throughout the system; and this increase is generally much above the state of organic nervous power or tone. Owing to this circumstance — to the deficient tone of the extreme vessels, and to the imperfect resistance opposed by them to the increased action of the heart — is to be attributed, in part, the occurrence of hæmorrhage; or, in other words, vascular action overcomes the resistance opposed to it by the vital tone of the capillaries of the part in which hæmorrhage takes place. The frequent increase of action in this class of diseases induced Dr. Cullen to arrange them amongst febrile complaints. But this increase is not general; and, even when it exists, it is often consecutive upon, or produced by, the sanguineous discharge. — When hæmorrhages are accompanied by excited action, the vascular excitement is frequently manifested chiefly in the parts affected, and in those adjoining them, in the form of active determination or congestion. Thus, in epistaxis, hæmoptysis, hæmatemesis, hæmorrhoids, &c., there is excited action in, or determination to, the organs or structures in the vicinity of the surface from which the blood is discharged, although the circulation in other parts of the frame may be natural, or even below the usual standard. This circumstance, in connection with the antecedent and concomitant phenomena of hæmorrhages, indicates an irregular distribution of vital action, generally attended by deficient organic nervous power or tone — an increase of vascular action in certain parts, and a diminution of it in others, rather than a state of general febrile commotion. In many instances, also, more especially in the symptomatic varieties, the extravasation is unaccompanied by increased action, and, as we shall see hereafter, is more frequently the result either of a morbid condition of the textures, or of the vessels themselves, or of impeded return of the blood, in connection frequently with plethora, local or general, and with other morbid states about to be noticed.

8. Whilst, however, we observe, thus frequently, an irregular distribution of vital action through the frame, the increased action, when increase exists, being in the seat and vicinity of hæmorrhage, it must be admitted that febrile commotion also sometimes exists and ushers in the sanguineous discharge. It would seem as if, in many of these cases, the febrile excitement accidentally produced, had given rise, owing to the increase of the *vis à tergo*, to the extravasation; the impaired tone of the extreme vessels being insufficient to antagonise the action of the heart.

9. In many cases, the hæmorrhage is altogether the result of irritation, particularly when applied to a mucous surface; but, in these, the sanguineous discharge is very slight, or is merely a part of the evacuation that takes place. Here the extreme vessels become enlarged or dilated, owing to that state of vital expansion which mucous and erectile tissues assume when subjected to irritants or stimuli. From the expansion thus induced, an increased momentum of blood in the enlarged capillaries, and the determination of the circulating fluid to this quarter, necessarily result. If we apply any irritating substance to a mucous surface, the nerves of the part are excited, their vital manifestations are at first augmented, and the capillaries are ultimately expanded or enlarged; the tissue assuming more or less of increased volume. This erectile state, which all vascular parts present in a greater or less degree, according to their vascularity, and the extent to which they are supplied with organic nerves, generally subsides when the irritation is withdrawn; but if it continues to act energetically, and especially if it affect the action of the heart, and thereby occasion general irritation or febrile commotion, the expansion of the extreme vessels may proceed so far as to solicit, upon hydraulic principles, so great a flux of blood through them as may overcome their power of vital resistance, or may occasion the exudation of this fluid through their pores, which, owing to their distension, acquire an increased diameter, and allow the red particles of the blood to exude. This result is still more likely to occur, when organic nervous power is deficient or depressed, as it frequently is in the constitutions and circumstances in which hæmorrhages occur.

10. The effect thus produced by material irri-

tants may take place from an excited state of the organic nerves supplying the tissue — the primary affection being in these nerves, and occasioning the vital expansion of the capillaries, the increased afflux of blood to these vessels, and all the contingent phenomena. Such appears to be the procession of morbid changes in many cases of active hæmorrhage of an idiopathic or primary kind. The first change takes place in the organic nerves of the affected part, and occasions the vital expansion of the capillaries, and thereby an increased flux of blood through these vessels, and the larger trunks supplying them; the excited state of the nerves, and the increased action of the vessels, being propagated to the heart through the medium of the organic nervous, and vascular systems. Thus febrile commotion is induced in the more active forms of hæmorrhage. If we attend closely to the symptoms in such cases, we shall find a sense of titillation, and of increased heat, with throbbing of the vessels, &c., ushering in the discharge of blood. These symptoms clearly indicate the first change produced on the organic nerves, and its effects upon the circulation of the part. At last the blood pours forth, and shows that the tone or power of resistance in the extreme vessels has so far yielded to the increased momentum of blood, as to allow the escape of a portion of this fluid through the pores of these vessels, and of the tissues in which they ramify; the vital cohesion of the tissues either being originally weak, or having become weakened by pre-existent disease, as in the case of consecutive hæmoptysis, or of hæmorrhage occurring in the course of fevers.

11. From this it will be seen, that, in active hæmorrhage, more or less excited action exists in the seat of the discharge, and, when it commences in this seat, it is propagated to the heart in the manner above stated. The mere demand which is made upon the heart by the augmented afflux of blood solicited by the dilated and discharging capillaries, is insufficient to account for the characteristic phenomena of this form of disease, without calling into aid the organic nervous influence, and the reaction consequent upon the sudden depletion of the vessels during a state of plethora. It will explain increased rapidity of the pulse, but little more. Whilst, however, I thus contend for the frequency of excited action in the seat of hæmorrhage, often confined chiefly to that situation or its vicinity, or extended more or less throughout the frame, and assuming various grades of activity, it must not be overlooked that this action is generally attended by impaired nervous power or tone, and weakened cohesion of the extreme vessels and tissues in which they ramify. In proportion to the feebleness of vascular action, and to the loss of vital tone and of cohesion of the capillaries and tissues, will the hæmorrhage present more of an asthenic or passive character. But there is no absolute or unvarying grade, to which the terms sthenic or active, and asthenic or passive, can be applied; but every degree of action, as well as of diminished tone, either above or below the healthy standard, will present itself in practice. This association of excited vascular action and capillary expansion, with weakened nervous tone and vital cohesion, argued far above, is fully evinced by the state of the pulse, which, in most hæmorrhagic diseases, is broad, open, compressible, soft, and sharp; the parietes of the artery being felt as if yielding to the impulse of the heart, but quickly reacting upon the momentum with which the current of blood is propelled; thus imparting a sharp, or bounding, or jerking character to the pulsation.

12. It is not only an irregular distribution of organic nervous power, with vascular excitement and deficient tone, by which hæmorrhages are frequently characterised; but the diminished cohesion of the extreme vessels, and of the tissues in which they ramify, above alluded to, is often the prominent feature of the pathological conditions in which these diseases originate.—This diminution of vital cohesion in the part is generally associated with debility; and with weak, although frequent, or even excited, action of the heart; the phenomena varying with the state of action, or the degree of excitement, or, indeed, with the modified grades in which the different elements of this pathological state present themselves. In such cases, the dilated and congested capillaries, the deficient nervous power, and the generally weakened vital manifestations of the frame, require, in their different grades, the accurate recognition and attention of the practitioner. In many cases of truly *asthenic* hæmorrhage, the frequency of the pulse is mistaken for excitement. But, in these, the frequent contractions of the heart are the necessary consequence of the loss of blood, and of the imperfect tonic contraction of the series of circulating vessels upon their contents — are the result of the loss of tension in the vascular circle, and of the facility with which the current is propelled in a relaxed and yielding channel.

13. ii. *Changes in the Structures, the Seats of Hæmorrhage.*—The escape of red blood from the vessels generally takes place upon those surfaces most engaged in exhalation and secretion, and in those structures, which, owing to their natural laxity, furnish a slight support to the capillaries supplying them. Yet extravasation will not take place, as already remarked, during a healthy state of the part, or when its vital cohesion *is* undiminished. It generally supervenes in consequence of certain lesions of the action and organisation of the vascular and capillary systems, or of the tissues which they supply, or of both together. But it should not be overlooked, that a change in the state of the tissues will generally, sooner or later, affect the capillaries supplying them, whilst a lesion of the latter will also affect the state of the former. The question, therefore, chiefly regards the priority of affection, and the extent to which either becomes changed. But it should also be admitted, that the lesion may be coëtaneous and co-ordinate in both the capillaries, and in the tissues the seat of hæmorrhage.

14. Discharges of blood seldom take place to any amount, excepting in textures which furnish, from original conformation, or from diminution of vital cohesion, an insufficient support to the capillary vessels; and which imperfectly enable them to withstand the distending power to which they are subjected, by the occasional increase of the heart's action, and of the momentum of blood passing through them; or by an impeded return of blood through the veins; or by general or local plethora. This important pathological fact is

demonstrated by the occurrence of hæmorrhages as a consequence of softening of the mucous surfaces, or of cellular and parenchymatous structures, or of serous membranes; particularly when their vital cohesion has been diminished by constitutional disease, and when the impulse or action of the heart and arteries has been increased by any external or internal cause. The sanguineous discharges occurring in dysentery, scurvy, purpura hæmorrhagica, fever, &c., are familiar instances of the influence of deficient cohesion of the tissues in the production of hæmorrhage; and epistaxis, hæmoptysis, hæmorrhoids, &c., illustrate a combination of this state with increased vascular action, in which both the heart and arteries participate.

15. iii. *Of Changes in the circulating Organs and Vessels in the Production of Hæmorrhage.* — As to the state of the capillaries in hæmorrhage, it is unnecessary to advance much beyond what I have already stated (§ 13.), because their conditions are very intimately associated with the states of nervous power and of vascular action characterising the attack. In all the more idiopathic hæmorrhages, the vessels cannot be said to undergo any rupture. Their minuter ramifications and extremities seem to be dilated, and their pores, whether lateral or terminal, so far enlarged by the deficient tone and cohesion of their parietes, and of the tissues in which they terminate, as to admit of the exudation of a large portion of the blood flowing through them. This state of the capillaries in the seat of hæmorrhage is, however, generally associated with other important changes in the circulation, and in the blood itself. The changes in the circulating organs vary in the different states of hæmorrhage. Those which precede and induce the discharge are generally different from those which accompany it, and ought to be carefully distinguished. They are principally the following: — 1st. Increased action of the heart, and general febrile commotion, as above explained — as in *active, sthenic*, or *febrile hæmorrhages.* — 2d. Determination of blood to the seat of hæmorrhage; or active congestion of its capillaries and larger vessels, with symptoms of excited action of the part and its vicinity chiefly — as in *sub-acute* cases. — 3d. Very frequent or very weakened action of the heart, with depressed nervous power, impaired tone of the circulation, and laxity of the soft solids — as in *asthenic, passive*, or *non-febrile hæmorrhages.* — 4th. Impeded circulation, and consequent congestion of the venous system, arising from disease of the heart. — 5th. Interrupted circulation through the liver, or impeded return of blood from any viscus or part — as in some *symptomatic hæmorrhages.*

16. The *first, second*, and *third* of these states have been sufficiently explained. — In the *first* and *second*, however, the dependence of the hæmorrhage upon inordinate action and hypertrophy of the heart should not be overlooked; effusion of blood within the cranium or into the lungs being occasionally caused by this organic lesion. — The *second* pathological state of the circulating system commonly precedes the discharge, or exists chiefly at its commencement — is frequently the immediate cause of the hæmorrhage and is generally removed by it, as in epistaxis, &c. — In the *fourth* of the above states, the hæmorrhage is entirely owing to the venous congestion or plethora induced by the cardiac disease. Extravasations of blood from this cause, generally assume states intermediate between active and passive. The obstruction to the circulation through some one of the cavities of the heart, extends its influence to the venous capillaries, and these also become congested. The action of the heart and arteries being unimpaired, or even increased, by the obstacle to the circulation through the veins, the congestion of the capillaries is thereby augmented, until, at last, their contents partially exude through their parietes or pores in the situations where they are of the greatest tenuity, or are weakest, or the least supported by the structures in which they are distributed. This form of hæmorrhage is analagous to the inflammatory action which occasionally takes place under similar circumstances; and differs from it chiefly in respect of the states of vital cohesion and tone in the vessels and tissues affected, and of the fluids discharged from the diseased parts. Where inflammatory action is the consecutive affection, the organic nervous power of the part, and the tone of the capillaries, have not been overpowered by the congestion or local plethora to which they had been subjected, but re-act upon the causes of distension. When, however, hæmorrhage is the result, we may infer, either that the tonic action of the capillaries has been overcome, and the blood has exuded through them, as just stated; or that the cohesion of the tissue has been so weakened as to deprive the capillaries of the necessary support, and thus to favour their dilatation and the consequent effusion; but it is very probable that this result more frequently arises from the co-existence of both these changes, than from either of them singly. This reasoning equally applies to the hæmorrhages consequent upon obstructed circulation through the liver, or interrupted return of blood through any part of the venous system. A large proportion of cases of hæmatemesis, of intestinal hæmorrhages, of hæmorrhoids, of hæmoptysis, and of extravasations into parenchymatous organs, are caused in part, if not altogether, by this state of the circulation; although debility, vascular plethora, &c. are also often concerned more or less in their production.

17. iv. *Of the States of the Blood in Hæmorrhages.* — Changes in the circulating fluid, as to quantity and crasis, are more concerned in the production of hæmorrhage, than modern writers have admitted. — In the *first* of the pathological states of the circulating system (§ 15. 16.), the blood possesses nearly its natural crasis; and, when vascular excitement is considerable, it often presents similar appearances to those in inflammation, and is not remarkably deficient in fibrine. In this state of the disease, especially, marked evidence of vascular plethora has preceded and ushered in the attack. — In the *second state* of the circulation (§ 15.), the blood may be of natural appearance, or it may participate slightly in the inflammatory or sthenic characters; or its crassamentum may be loose, and either large or small, for the quantity of serum. Its fibrine may be also more or less deficient. In this state, general as well as local plethora usually exists at the commencement of the seizure.

18. In the *third*, or decidedly *asthenic*, pathological condition (§ 15.), the blood is more manifestly altered than in either of the above. It usually does not separate into a firm coagulum. Sometimes no separation into crassamentum and serum takes place; and, if it does so separate, the former is loose, dark, or even black, particularly in its lower part, and readily mixes with the serum, in which it is occasionally sunk, appearing like a black deposit at the bottom of the vessel. In some cases, the blood flows from the part like a dark cruor or sanies, without coagulating, or contributing thereby to the arrest of the discharge: in other instances, it is pale, thin, and watery. The deficiency of fibrine in all these circumstances is very remarkable. In several, the serum is unusually albuminous. In this form, there may be general or partial vascular plethora at the commencement of the attack; but I believe that a state of anæmia is sometimes present, particularly when the blood is pale, thin, and watery; at least, there is an obvious deficiency of fibrine and of red particles. This state of the circulating fluid is sometimes primary; is not infrequently associated with a lax or delicate organisation of the extreme vessels; and evidently contributes to the production of the hæmorrhage: the weak or lax capillaries giving a ready issue to the thin fluid, especially in its state of deficient crasis.

19. Whilst the *first*, *second*, and *third* pathological conditions of the vessels above noticed, — which may be considered as constituting the more idiopathic forms of hæmorrhage—are thus attended with various morbid states of the circulating fluid; some of these states, however, being proper to, or the usual concomitants of, these conditions of the vessels; it should be recollected that each of these conditions insensibly passes into one another, and that each of those morbid appearances of the blood is variously modified and combined; so that hæmorrhagic diseases, in the different forms, states, and complications in which they present themselves to our notice, are occasionally accompanied with every morbid change comprised in the article on the *Pathology of the* Blood. Moreover, the appearance of this fluid varies, at different stages of the same seizure, with the quantity lost, and with the depression of vital power thereby produced; so that when the hæmorrhage has been to a very considerable amount, the proportion of serum becomes relatively much increased, owing to the rapid absorption of fluids into the circulation from the prima via, and different tissues and organs; the density of the coagulum being, at the same time, more or less diminished, and the quantity of fibrine remarkably lessened, as the sthenic passes into asthenic action, until, at last, fibrine can scarcely be detected in the more asthenic or passive forms of the disease.

20. Of the frequency of *plethora*, general or local, as an element of the pathological condition ushering in hæmorrhage, the practitioner should be fully aware; as the removal of this state is intimately connected with the prevention and judicious treatment of the disease. The quantity, as well as distribution, of the blood in the system, the state of organic nervous power, by which local determinations of blood are chiefly produced, the degree of vascular action, and the turgidity of the part affected, vary with the *age* of the patient, with his constitution and temperament, and with the nature of antecedent or associated disorder. It may be stated as a general inference, that hæmorrhages are more referrible to excited action of the heart, to irritation in the seat of discharge, and to a dilated or morbidly erectile state of the capillaries, conjoined with increased action of arterial vessels, and, consequently, that they partake more of an acute, active, or sthenic character, the earlier the age of the patient. On the other hand, they more evidently depend upon obstruction to the venous and capillary circulation; on a softened, relaxed, or diseased state of the structure, in which they occur; and on lesions of the vessels themselves; and, therefore, are more commonly of a passive or asthenic kind, or, at least, present the lower grades of activity, the more advanced the periods of life at which they take place. As to the influence of *age* on the forms of hæmorrhage, my opinions are not very different from those of Stahl, in whose writings may be found much of what has more recently been advanced on the pathology of this class of diseases.

21. v. Remote Causes of Hæmorrhage. — *a. Predisposing causes.* — The frequency of hæmorrhages, especially their more active states, is greater in the sanguineous, the irritable, or the sanguineo-bilious *temperaments*, in plethoric constitutions, and in the scrofulous *diathesis*, than in the nervous, lymphatic, and melancholic temperaments, and in spare habits of body.—They are more common and abundant towards the completion of youth, than at any other period; and they are comparatively rare in infancy and in old age. Females are more subject to them than males. They occur sporadically, and are more frequent in spring than at any other season; but are scarcely ever epidemic; although at Breslaw they prevailed at one time to a remarkable extent,—children having epistaxis, adults hæmoptysis, and the aged hæmorrhoids. There may be said to be a hæmorrhagic *diathesis;* inasmuch as hæmorrhages are more common in the offspring of parents who have experienced attacks, than in others; and as they are often observed in several children or members of the same family. M. Chomel remarks that hæmorrhages from the rectum, urinary organs, and uterus, occur oftener in cold than in warm seasons; and that epistaxis and hæmoptysis takes place more frequently in summer than in winter. I believe that this is the case, especially during dry states of the air. In childhood, hæmorrhage takes place chiefly from the pituitary membrane; in adolescence, from the bronchial surface; and in mature age, from the rectum, the urinary and uterine organs. —Whatever tends to increase the quantity of the circulating fluid, is, so far as it has this effect, a predisposing cause of hæmorrhage; as too much or too little nourishing food, indolence, the suppression or retention of accustomed discharges, the neglect of requisite evacuations, and the loss of a limb.

22. *b.* The *exciting causes* are—sudden increase of temperature; great dryness, and the rapid diminution of the weight, of the atmosphere; the use of alcoholic liquors or of other stimulants; violent mental emotions, especially anger, joy, &c.; too warm clothing, or too warm apartments; muscular exertions, quick walking or running; ascend-

ing heights; and various chemical and mechanical irritants. These causes generally give rise to the more active or *sthenic states* of the disease. Dr. Parr very justly disputes the rarefying influence of heat on the blood in the production of hæmorrhage, and refers the operation of this agent chiefly to the living solids. There can be no doubt of heat not only exciting the nerves, but also causing an expansion of the extreme capillaries and increased fluxion to the parts affected by it.—The usual causes of debility — as insufficient and unwholesome nourishment, the depressing passions, fatigue, contamination of the circulating fluids by impure or close air, poisonous injesta, exhausting secretions, masturbation, &c.—principally occasion *asthenic* hæmorrhages.

23. vi. The Symptoms differ very remarkably according to the situation and circumstances in which hæmorrhage takes place. They vary also with its extent and rapidity — according as it constitutes the principal lesion, or is a contingent and comparatively unimportant phenomenon. When extravasation takes place in the substance of an organ, the functions performed by such organ will be interrupted co-ordinately with its amount and rapidity; but when it occurs into one of the large serous cavities, little interruption of function is observed, until the effusion is so great as either to produce syncope or to embarrass the adjoining organs by pressure. Hæmorrhage from mucous surfaces is generally made manifest by its discharge through the outlets of the canals in which it takes place. Yet, even in these cases, the extravasated blood may be retained, although its quantity is so great as to give rise to the most serious results. The *blood* itself presents all the appearances already described (§ 17. 18.), according to the state of vital power and of vascular action, and the quantity and quality of this fluid. If it be contained long in any cavity or part, it will be coagulated, or grumous, or thick, dark, greenish, brown, or sanious, or otherwise altered, according to the situation, the period of retention, and the state of the patient. When extravasated blood passes through a large portion of the digestive canal, it is still more remarkably changed by admixture with the secretions, gases, and other matters in this situation. Hæmorrhage, as to quantity, varies from a few drops to several pounds.

24. *A.* The *symptoms* preceding and attending hæmorrhage differ so as almost to defy description. — The more active and *sthenic* forms are preceded by signs of general plethora and of increased action; slight horripilations, and a frequent, full, open, and jerking, or bounding pulse, often ushering in the attack. The more *asthenic* states frequently are unpreceded by any distinct premonition, and are unattended by vascular reaction; flaccidity of the soft solids, with a weak, soft, rapid, or expanded pulse generally accompanying the discharge. In the *former*, there is a sense of heat, tension, fulness, and throbbing, with slight or shifting pain, at the commencement, and often actual increase of temperature in and near to the seat of hæmorrhage. In the *latter*, these sensations are rarely felt, and increased temperature is not observed; general uneasiness, with pallor, shrinking, and coldness of the extremities, in various degrees, being common to both.—In the *active* states, the blood is florid, coagulates readily and firmly, and frequently ceases to be discharged as soon as the evacuation has proceeded so far as to remove the plethora, and increased action occasioning it; the patient often feeling lighter and better from the attack. But this is by no means uniformly the case; as the hæmorrhage sometimes proceeds to a dangerous extent, not merely as respects the organ affected, but as regards the quantity of blood lost to the œconomy. This arises from the nature of the local lesion associating itself with the hæmorrhage, or from the vital depression caused by the discharge, or from the lost power of the capillaries, or from the difficulty with which local fluxion or determination of blood is arrested, when once established and an outlet given to it, particularly when the coagulating property of the blood is impaired owing to deficiency of fibrine, or from two or more of these causes conjoined.—In the *passive* states, on the contrary, the blood is dark, fluid, thin, or even pale, and incapable of coagulating firmly, or even at all. The powers of life sink still lower as the hæmorrhage proceeds, and become less capable of arresting it, until the relation subsisting between the action of the heart, the tonic contraction of the arteries upon their contents, and the quantity of the contents in respect to the power of vital reaction possessed by these vessels, is subverted; and the patient, in consequence of the subversion, experiences successive attacks of syncope, or suddenly expires.

25. In all cases where hæmorrhage proceeds so far as to depress the pulse, or does not stop after the plethora and increased action have been removed by it, and still more remarkably in the asthenic forms, pallor of the countenance and general surface, coldness of the extremities, a shrunk or empty state of the cutaneous veins, faintness or full syncope on assuming the sitting posture, are present, in a degree usually coordinate with the extent to which the discharge has proceeded.

26. *B.* The *Duration* of hæmorrhage is extremely various. It may only continue a few seconds, or many hours, or even days. It may persist with slight intermissions for months or even years. It may be continued, or remittent, or intermittent. When this last, it may be either irregular or periodic.

27. vii. The Diagnosis of hæmorrhage requires but little remark, as the subject is more fully noticed hereafter. In cases of very sudden and copious internal hæmorrhage, causing syncope or sudden death, these results may be mistaken for the more common forms of syncope, or for death from apoplexy or from disease of the heart. But the remarkable pallor of the lips, tongue, gums, and general surface; the smallness and emptiness of the jugular and superficial veins; the circumstance of the veins not filling beyond where pressure is made; and the history of the case previously to, and at the time of, either of these occurrences taking place, will point out the nature of the disease, even although no external discharge of blood be observed.

28. viii. The Prognosis entirely depends upon the situation and form of the hæmorrhage.—It is extremely unfavourable when it takes place into the structure of an organ. It is equally so, when it occurs into serous cavities. When it proceeds from mucous surfaces, the danger is generally very much less: it is, however, great, when it is symptomatic of structural disease of the vessels, or of any part of the circulating system, or

of tubercular formations, and when it unequivocally presents asthenic characters. The prognosis is the most favourable, when the hæmorrhage is primary or idiopathic; when it arises chiefly from plethora and excited vascular action; and when it is seated in mucous canals. The nearer to the outlets of these canals it takes place, the less is the risk from it.—Epistaxis and hæmorrhoids are unattended by any danger, unless in cachectic habits, or when there is serious associated disease of related parts; or when protracted, asthenic, or uncontrolled by treatment. But the prognosis must be formed from the states in which individual forms of hæmorrhage present themselves in practice.

29. ix. Division of Hæmorrhages.—Discharges of blood have been divided, in modern times, into certain forms or states indicative of the circumstances in which they take place. Their separation into *active* and *passive* has been very generally adopted since the days of Stahl, who first employed this division; and these terms, or their correlatives, *Sthenic* and *Asthenic*, have been retained for the purpose of expressing the states of vital power and of vascular action upon which hæmorrhages principally depend, in their more idiopathic states. They have likewise been very generally divided into *Idiopathic*, *Traumatic*, and *Symptomatic*,—an arrangement to which, as well as to the former, attention should be paid both in pathology and in practice; and which has been very generally followed, even when the terms *primary*, *essential*, and *spontaneous* have been adopted with reference to the first of these; and *secondary*, *consecutive*, or *sympathetic*, to the third. —Hæmorrhages have also been classed into *Constitutional*, *Accidental*, and *Critical*. Willis arranged them into *critical*, and *morbid* or *non-critical*; Darwin, into *arterial* and *venous*; and Bichat, into those proceeding *from rupture*, and those *from exhalation*. A much more elaborate arrangement has been proposed by Lordat. He divides hæmorrhages into — 1st, Those proceeding from a *general fluxion*; — 2d, from *expansion*; — 3d, from *local fluxion*; — 4th, from *adynamia*; — 5th, from *loss of resistance* in the part; — 6th, from *expression*; — 7th, from *wounds*; — 8th, from *sympathy*. MM. Pinel and Bricheteau have proposed a division of this class of diseases into — 1st, *Constitutional*; — 2d, *Accidental*; — 3d, *Vicarious*; — 4th, *Critical*;—and, 5th, *Symptomatic*. M. Chomel has arranged them into—*α*, *active*,—*β*, *passive*,—*γ*, *constitutional*, and —*δ*, *accidental*. Dr. Carswell has classed them as follows: — i. *Hæmorrhage from Physical Lesions.* — *A.* From solutions of continuity — *a.* Incised wounds; — *b.* Puncture; — *c.* Laceration; — *d.* Ulceration; — *e.* Mortification: — *B.* From mechanical obstacles to the circulation — *a.* Situated in the heart; — *b.* In the blood-vessels.— ii. *Hæmorrhage from Vital Lesions.* — *A.* From a modification of the functions of the capillaries — *a.* In vicarious hæmorrhage; — *b.* In hæmorrhage from erectile tissue: — *B.* From a diseased state of the blood — *a.* In scorbutus; — *b.* In some forms of purpura; — *c.* In some forms of typhoid fever: — C. From debility — in depending parts of the body. — The chief objection to this ingenious arrangement is the neglect of the states of vital power and of vascular action more or less characteristic of the primary forms of hæmorrhage.

30. The following classification will be found to comprise all those states of hæmorrhage which fall within the province of the physician, and respecting which a full inquiry has been instituted above.

i. Hæmorrhage from Physical Causes: — *A. From sudden diminution of the weight of the atmosphere;* support being thus removed from extreme vessels and from yielding tissues, &c., whilst the impulse, or *vis a tergo*, is undiminished: — B. *From incision, puncture,* or *laceration of a vessel or vessels.*

ii. Hæmorrhage from Lesions of Vital Power and Action: — *A. From excited action chiefly* — *a.* Of the vascular system generally; — *b.* Of the vessels in the seat of hæmorrhage principally, or from local determination: *B. From plethora* — *a.* Associated with general excited action; — *b.* With local action or determination; — *These constitute active or sthenic hæmorrhage*: — *C. From debility chiefly* — hæmorrhage taking place in depending or relaxed parts: — *D. From deterioration of the blood* — *a.* Conjoined with debility and impaired action; — *b.* With excited action and exhausted vital power — as in certain states of fever, &c. — *These constitute passive or asthenic hæmorrhage.*

iii. Hæmorrhage from Interrupted Circulation: — *A. Through the heart;* — *B. Through the portal vessels.* — *C.* Through other venous trunks. — In all these venous and capillary congestion precedes, and chiefly causes, the discharge.

iv. Hæmorrhage from Organic Lesions: — *A. From alterations of the vessels themselves.* — *a.* From inflammation, softening, rupture, &c. of their coats; — *b.* From ossific, or other morbid formations in their tunics:—*B. From lesions of the tissues the seats of hæmorrhage*—*a.* From softening of the tissue; — *b.* From ulceration; — *c.* From tubercular formations, &c.; — *d.* From mortification. — The *first* and *second* of these orders comprise these forms of hæmorrhage which are usually denominated *primary*, *idiopathic*, or *essential*; the *third* and *fourth*, those which are commonly called, *secondary*, *consecutive*, or *symptomatic*.

31. x. Treatment. — The treatment must have strict reference to the morbid conditions on which hæmorrhage depends, and according to which I have attempted to arrange the forms and states of the disease. In the observations, however, about to be offered, I shall allude merely to those varieties which chiefly require medicinal aid, and pass over those demanding the active interference of the surgeon.

32. *A. Hæmorrhage from physical causes*, particularly from puncture, incision, and laceration, seldom falls within the province of the physician; but when it does, as when occurring in any of the internal viscera, the principles which should guide him in other cases ought to direct him in this: inordinate action should be restrained, in order to diminish the effusion and to prevent its recurrence; and extremely depressed power cautiously restored, especially when life is thereby threatened, or when the system is incapable of producing coagulable lymph, by means of which a firm coagulum may be formed, and further hæmorrhage be thus prevented.

33. When the hæmorrhage is caused by the sudden diminution of atmospheric pressure, the propriety of having recourse to bloodletting, unless vascular action be manifestly increased, is

questionable. - The removal of the cause, when the hæmorrhage is urgent, should alone be confided in. In slighter cases, the sanguineous discharge generally disappears soon after the vascular system has accommodated itself to the novel circumstances in which it is placed.

34. B. *Hæmorrhages from changes in vital power and vascular action* interest chiefly the physician, and require the utmost pathological discrimination and practical decision. Upon the opinion that will be formed as to the degrees of augmented action, or of diminished power, or of vascular repletion, or of asthenia, not only will the success of the treatment, but also the life of the patient, depend. And amongst the most difficult of the many difficult topics with which the practical physician will have to concern himself, none is more difficult or more important than to discriminate the pathological conditions just mentioned.

35. *a. Hæmorrhage depending upon, or connected with, excited vascular action,* generally requires an antiphlogistic treatment; but with strict reference to the degree of action and of organic nervous power, and to the quantity of blood which has been lost. Of these states the practitioner should be capable of forming a correct estimate, and of directing remedies appropriate to them with a decision commensurate with the urgency of the case.—When the discharge takes place from vital organs, he ought not to confide in a single remedy only, however energetic or appropriate; nor even in a succession of remedies; but should so combine his means as that the one may promote the operation of the others.—*a*, When the action of the heart and vascular system is increased, especially if the patient be young, plethoric, or robust, *bloodletting*, general, local, or both; and internal and external *refrigerants*, conjoined with *sedatives* and *astringents*, are indispensable. But the practitioner should be careful in discriminating between the broad, open, quick, and irritable pulse frequently attendant upon hæmorrhage with deficient vital power, or upon the reaction following large losses of blood, and the full, hard, and jerking pulse more commonly observed at the commencement of sthenic hæmorrhage. I have already shown, in the article Blood (§ 58.), that copious losses of this fluid, especially when productive of vital depression or syncope, are generally followed by more or less of reaction. This reaction should be prevented from wholly supervening, or from reaching an inordinate pitch, lest it reproduce the hæmorrhage, and thereby endanger the life of the patient. When it occurs after large hæmorrhages, we should carefully determine, from the tone and character of the pulse, from its softness or compressibility, or action under the pressure of the finger, the degree of tone or vital power attending it. By thus endeavouring to estimate the exact state of the vascular action, attendant, as well as consequent, upon hæmorrhage, the conclusions, which will be arrived at, will suggest the most efficient means of cure.—In cases where the excited action has been preceded by a large loss of blood, we shall in vain attempt to restrain it by further depletion; for it will be generally found that, however excited the action, or frequent the pulsation, vital power is extremely depressed; and that a further depletion will only render the heart's action more frequent, and the pulse more irritable. It is in such circumstances, especially, that a decided but judicious use of sedatives, refrigerants, and astringents, such as will be hereafter noticed, should be resorted to.

36. In cases unattended by general vascular excitement, or in those characterised chiefly by local determination, vascular action being manifestly concentrated, more or less, towards the seat of hæmorrhage, and proportionately diminished in other places, a principal part of the treatment should be calculated to derive the blood from the organ affected, and to equalise the circulation. In such cases, *cupping*, warm *pediluvia*, and, when vital power is much depressed, and the further loss of blood cannot be afforded, *dry cupping*, should not be neglected. This last means I have found of great benefit when extensively or repeatedly resorted to.

37. In general, leeches are not appropriate means of depletion in hæmorrhages, although they may be of service in removing the local congestions or inflammatory irritation sometimes consequent upon them. Cupping should be preferred when local depletion is required; and in most instances in which bloodletting is indicated, even in a small quantity, venæsection will be the preferable mode of performing it. Most of the older writers advised, for the removal of hæmorrhage, venæsection in the standing or sitting posture, and with a large orifice, with the intention of speedily producing syncope; believing that a coagulum would be more likely to form at the orifices of the bleeding vessels during this state. If the hæmorrhage proceeded from one or more large vessels, as in wounds and injuries, the propriety of this practice need not be disputed. But when the blood is merely exuded from the mucous surface, as in most cases of internal hæmorrhage, this practice is of more doubtful efficacy; and, if it were generally adopted, even in young and robust persons, might be injurious, especially if the discharge had been already copious. Besides, the reaction consequent upon full syncope may cause a return of the effusion. It will, therefore, be preferable, in the majority of instances, to carry the depletion no further than to produce slight faintness, avoiding the supervention of full syncope; and to give refrigerants or astringents and anodynes so as to prevent subsequent reaction.

38. *β. Evacuations* by *emetics* and *purgatives* may be either beneficial or prejudicial, according to the peculiarities of the case. But the circumstances indicating or contra-indicating their use, will be made manifest, when I come to consider hæmorrhage with reference to its seats.

39. *γ. Refrigerants* are important agents in the controul of sthenic hæmorrhage, and much discrimination may be shown in the selection of them for particular cases. In general, those which are astringent, and increase the crasis of the blood, should be preferred.—The *mineral acids*, especially the sulphuric, the sulphates, the nitrates, the vegetable acids, particularly the acetic, and the internal and external application of cold, are severally useful in various circumstances.—The most energetic, however, of these, are the *sulphate of alumina* or the *super-sulphate of potash*, given in the compound infusion of roses, and the *super-acetate of lead* with acetic acid; but, in these, the

astringent is equally powerful with the refrigerant action. The *nitrate of potash* and the *muriate of ammonia* are useful refrigerants, but are most beneficial in the circumstances about to be noticed. *Cold*, internally, as iced water or iced lemonade, &c., or externally, in any of the various forms of applying it, is an useful adjuvant of other means; but it should not be employed so as to give rise to reaction, or to favour congestion in the seat of the disease, — consequences which may follow its injudicious use, internally as well as externally.

40. δ. *Astringents*, in active hæmorrhage, are most serviceable, after evacuations have been carried as far as circumstances permit. They should be either conjoined, or alternated, with refrigerants; and occasionally, also, with demulcents and sedatives or anodynes. Any of the individual substances belonging to this class of medicines may be employed according to the urgency of the case; but, with the exception of the spirits of turpentine, the mineral are more energetic than the vegetable astringents. Of the former of these, the *sulphates* of alumina, of zinc, of copper, and of iron, are most frequently employed, either alone, or in vehicles containing diluted sulphuric acid. The tincture of the *muriate of iron* and the *nitrate of silver* are also often used, both externally and internally; but these, and all the vegetable astringents, with the exception just made, are also tonic, and are less serviceable in active than in passive hæmorrhages. In the former, however, they are often useful; and, when given in doses so large as to occasion nausea, they have also a sedative action. The *acetates of lead*, with acetic acid, and the *acetate of zinc*, are, on account of their sedative action, amongst the most appropriate mineral astringents in active hæmorrhage.

41. The spirit of *turpentine* appears to have been employed by the ancients in the treatment of hæmorrhages. It was much used, both internally and externally, during the sixteenth century, but had afterwards fallen into disuse. In the year 1817, I employed it internally in these diseases, and have since continued to prescribe it. (See my *Memoir on the Use of Terebinthinate Remedies in Disease, Lond. Med. and Phys. Journ.* for July and August 1821.) It constringes the capillaries of the part to which it is applied; but, owing to its stimulating action on the nerves, sthenic vascular reaction frequently follows; which, however, soon subsides. When used in large quantity, these effects are proportionately great; and it thereby exerts a powerful derivative influence. When absorbed into the circulation, its astringent effects on the capillaries are also remarkable. Its action varies much with the dose, relatively to the vital energy of the patient. When the dose is large, it reduces the frequency and strength of the heart's action, especially when they are much increased; and hence it is an appropriate remedy in the more active forms of hæmorrhage, inasmuch as, with its constringing action on the capillaries, it weakens the *vis a tergo*. When given in smaller doses, and carried into the blood, it increases the tone, and changes or modifies the action of the extreme vessels. From a very extensive experience of this medicine in hæmorrhagic and other diseases, I may add, that large doses of it should be prescribed with caution, when the powers of life are very much depressed; and that, when a considerable dose of it has been given in such cases, it ought to be carried off by stool. The existence of inflammatory action does not contra-indicate its use, as many have supposed from a misconception of its operation; for it lowers vascular excitement, and prevents effusion and the formation of coagulable lymph, especially when taken in sufficiently large or repeated doses. When the powers of life are much impaired, and after copious evacuations of blood, small and frequent doses of it only ought to be given, conjoined with tonics, aromatics, restoratives, &c.

42. ε. *Sedatives* and *Narcotics* are severally beneficial in active hæmorrhages, but chiefly as adjuvants of more energetic means. The most useful sedatives, in this form of the disease, have already been noticed. — *Hydrocyanic acid* and its preparations are sometimes of service, when much irritablity, spasm, or restlessness, attend or follow the hæmorrhagic attack. *Digitalis* is, however, more generally appropriate, inasmuch as it lowers the action of the heart, and increases the tone of the extreme vessels. — *Narcotics*, especially opiates, are frequently serviceable in similar circumstances, but chiefly in combination with astringents and refrigerants. *Opium* may be conjoined with any of the substances comprised in these classes of medicines; or the acetate of morphia may be given with the acetate of lead, or the muriate of morphia with the muriated tincture of iron. Hyoscyamus, conium, the humulus lupulus, colchicum, and other narcotics, have been severally recommended to palliate some of the contingent phenomena of the disease; but they require no further remark.

43. ζ. *Diaphoretics* have been employed with the view of equalising the circulation, or determining it to the surface of the body, especially when coldness of the extremities and skin accompanies the discharge. But the cooling diaphoretics should only be prescribed—as the nitrate of potash with the sweet spirit of nitre, and the solution of the acetate of ammonia with an excess of acetic acid. In order to derive to the surface, and to equalise the circulation, external derivatives, rather than stimulating diaphoretics, ought to be employed.— The derivatives most to be confided in, in these cases, especially when the hæmorrhage is copious, are the hot turpentine epithem or embrocation, or sinapisms; but the former is much more quick and efficient in its operation, than the latter.

44. η. *Demulcents*, especially the gums, were formerly much employed in hæmorrhage; but are now seldom used, unless as vehicles or adjuncts of more active substances. They are, however, of service in several forms of hæmorrhage, especially where it is desirable to diminish irritation in mucous passages or canals. Powdered gum, when applied to a bleeding vessel or surface, will sometimes arrest the discharge by promoting the coagulation of the blood.

45. *b. Hæmorrhages depending upon asthenia, or the more passive states of hæmorrhage noticed above,* should be attacked directly by means of astringents and derivatives.—α. *Bloodletting* is generally inadmissible; and *refrigerants* must be employed with caution, unless their astringent action be very considerable. Even *cold* should be cautiously prescribed. In some cases, the momentary impression of cold, as of iced water sprinkled on the back or on the genitals, is of service; but a prolonged application of it may be

injurious, or even dangerous. The *vegetable astringents*, as possessing more or less of a tonic property, are especially indicated in the asthenic forms of hæmorrhage; and, of these, the *extract of catechu*, *kino*, the preparations of *krameria; tannin* and *powdered galls;* the bark of the root or fruit of the *pomegranate;* the *simarouba* and *cinchona* barks; infusions of *oak bark*, or of the *uva ursi*, or of *roses*, or of the root of *tormentilla*, or *bistorta;* the *vegetable acids*, also, especially the gallic and acetic; *kréosote* conjoined with the latter of these, or with some other vegetable astringent; the *ergot of rye;* the *terebinthinates;* the *balsams*, and *camphor*, are severally appropriate; and either of them may be prescribed with other means, according to the circumstances of the case. Of these, the spirit of turpentine, in small and frequent doses, with tonics, restoratives, and aromatics, is most deserving of confidence. The *mineral astringents*, especially those already noticed (§ 40.), and the *tonic mineral salts*, may also be employed.

46. *β*. When hæmorrhage proceeds chiefly from, or is connected with, a *deteriorated state of the circulating fluids*, the *chlorate of potash*, or the *chlorate of lime*, may be prescribed with tonic or astringent infusions; and the nitrate of potash may be added, or taken alone in similar vehicles. The spirit of turpentine may also be given in small and repeated doses, with camphor and aromatics.

47. *γ*. In all the forms of asthenic hæmorrhage, *derivatives*, especially the hot turpentine epithem and sinapisms, are of great benefit.—*Emetics* and *cathartics* are rarely indicated; although morbid secretions and fæcal accumulations ought to be evacuated.—*Diuretics* are of service chiefly as adjuncts of more energetic means.—*Anodynes* are rarely necessary; but digitalis is sometimes useful, conjoined with tonic astringents.—*Opiates* are also occasionally serviceable, in similar combinations.

48. *δ*. In those *intermediate states of hæmorrhage*, in which it is difficult to determine whether the active or the passive conditions predominate, and where there appears to be an irregular distribution of action and vital power, rather than general excitement or depression of either, *derivation* by *dry cupping*, by the warm *turpentine embrocation*, or by *sinapisms*, and the internal use of appropriate *astringents*, are chiefly to be relied on.

49. *c*. Those forms of hæmorrhage which may be denominated *constitutional*, and which partake more of the active than of the passive character, require much discrimination. They are generally dependent chiefly upon absolute or relative plethora; and ought not, therefore, as in many other cases of active plethora, especially when thus associated, to be early or officiously interfered with. This form should, therefore, be promoted when incomplete, or treated by depletions, and moderated or arrested when it becomes very considerable or excessive.—When a constitutional hæmorrhage is abortive or prematurely arrested, sanguineous effusion may take place in the parenchyma of an organ, or in some dangerous situation. In this case, the morbid deviation should be combated by means calculated to restore the hæmorrhage to its former seat, to arrest it in the part consecutively affected, and to prevent the bad consequences likely to ensue in the latter situation.—If the hæmorrhagic deviation—the change in the seat of constitutional hæmorrhage—is favourable, as when epistaxis or hæmorrhoids occur, instead of hæmoptysis or hæmatemesis, the interference of art ought not to be interposed, unless the loss of blood is very considerable or alarming.

50. *d*. When hæmorrhage depends upon *obstructed circulation in the heart, liver, or lungs*, and, consequently, upon venous plethora, the *indications* are — to remove this obstruction as much as possible; to diminish the fulness of the veins; to determine predominant action to external parts; and to impart tone to the surface and capillaries affected. The means by which the *first* of these ends is to be accomplished, are pointed out in the articles on the diseases of the organs just mentioned; and those which will accomplish the other intentions have been already noticed.

51. *e*. In all forms of hæmorrhage, the indications of cure, as well as the individual means, should more or less depend upon the causes, upon the seat, and upon the quantity, of the effusion; and should, moreover, be modified by the symptoms, by the age, and the previous state and habits of the patient. For the hæmorrhages which mainly depend upon organic lesions, the treatment should be directed to the removal of these lesions; but, when the effusion is considerable, or takes place into the substance of an organ, immediate means ought first to be used to arrest it; and these means should be strictly appropriate to the states of vascular action and of vital power, conformably with the principles already developed. It is indispensable to the judicious treatment of hæmorrhage, to ascertain and to remove the remote and immediate causes; and to place the patient in a situation and circumstances favourable to the removal of the attack, as well as to the prevention of its recurrence. Hæmorrhage from the lungs, the stomach, intestines, and urinary organs, as well as into the parenchyma of internal viscera, and into shut cavities, are serious occurrences, and should be immediately arrested. When it proceeds from the nose or anus, it is seldom dangerous, and may be left to itself, unless it become excessive. Whenever the loss of blood, in whatever situation it occurs, is so great as to produce much debility, prompt measures should be employed to arrest it. If syncope takes place in such circumstances, the recumbent posture; the aspersion of cold water, or of a small quantity of eau de Cologne or lavender water, on the face; or aromatic vinegar held at a little distance from the nostrils; will restore the patient. But if the hæmorrhage has been so great as to render these means insufficient, an immediate recourse may be had to the transfusion of blood from a healthy person. When convulsions supervene upon large losses of blood, opium, with camphor or other restoratives, should be prescribed.

52. ii. *Of Regimen and Prophylaxis.* — *a*. In *active hæmorrhage*, the patient should be removed to a cool apartment, and repose of body and mind enjoined. He ought to be so placed as that the seat of effusion is most elevated. The clothes should be taken off or loosened; and every obstacle in the way of external applications removed. — When the hæmorrhage has ceased, the same antiphlogistic regimen as was pursued during its

continuance, should be persisted in for some time; and gradually changed. If the effusion have been slight, and particularly if the pulse continue full or strong, venæsection or cupping should be practised, or even afterwards repeated, in order to prevent a recurrence of the hæmorrhage, or the supervention of congestion or inflammatory action in the part. When the discharge and the treatment have removed both the attack, and the attendant general and local plethora, the practitioner should endeavour to ascertain still further the pathological conditions from which the hæmorrhage proceeded, as well as those which remain after it, and to remove them. He ought also to enjoin the avoidance of whatever may cause plethora, or may determine the circulation to the seat of hæmorrhage, or weaken organic nervous power. If the symptoms indicating the recurrence of hæmorrhage appear, a full venæsection should be practised.

53. The *Diet* ought to be chiefly farinaceous; and ripe acidulous or mucilaginous fruits should be liberally allowed. The drink should be made slightly acid, by vinegar, or any of the mineral or vegetable acids. This diet ought to be continued long after the attack. The strong or rich wines, all malt liquors, and spirits, should be uniformly shunned.

54. *b.* After *passive hæmorrhage,* the system should be strengthened, by means the least likely to cause plethora; by regular and moderate exercise in the open air, near the sea; by sea voyaging or short excursions; and by avoiding whatever is likely to favour congestion of the seat of the former effusion, and to depress the mind.

55. *c.* The *repetition* of hæmorrhage, whether of an active, passive, or intermediate character, ought to be carefully prevented; as two evils result from this circumstance, independently of the danger directly connected with it: if the attacks are slight, they are apt to become habitual or constitutional; and, whether slight or severe, they cause disorganisation of the part affected. When hæmorrhage has become habitual, it should not be prematurely suppressed, without having recourse to vascular depletions in its stead, or instituting some external discharge; and even this latter may not be sufficient.

56. *d. Constitutional hæmorrhage,* when it is abundant and debilitating, should be treated, in the intervals, by a spare and cooling diet and regimen. Positions which will favour the flux of blood to the organ affected, or impede the return of it, should be avoided; and direct or indirect excitement or irritation of the part, ought to be removed. Whatever tends to produce plethora, or to weaken nervous power, and vascular tone, should also be shunned. (See art. Crisis, for *Critical Hæmorrhage;* and Arteries and Veins, for *Hæmorrhage Symptomatic of Organic Lesions of these Vessels.*)

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Hæmorrhages considered with respect to their Seats.

57. In treating of hæmorrhage, as regards the situations in which it takes place, I shall notice it — First, *In parts which admit of the external discharge of the effused blood*, as from the skin, and from the mucous surfaces; the latter of these comprising the most important of the diseases usually denominated hæmorrhagic. — Second, *In serous or shut cavities, necessarily followed by a greater or less accumulation of the effused blood.* — Third, *In the areolar tissues or parenchyma of the viscera.* — In discussing the particular forms of hæmorrhage according to this arrangement, due reference will be made to the vital conditions and morbid relations upon which hæmorrhages were shown, above, more or less to depend.

II. Hæmorrhage from the Skin. — Syn. *Hæmorrhagia per Cutem*; *Hæmatidrosis*, Ploucquet; *Sueur de Sang*, Chomel.

58. Defin. — *An exudation of a sanguineous fluid from a part or the whole of the cutaneous surface, most frequently the former, without abrasion of the cuticle.*

59. Hæmorrhage very rarely takes place from the whole of the cutaneous surface; and rarely even from a limited part. The effusion of blood *under* the cuticle, as in scurvy and purpura, &c., is different from the form now being considered, in which it is external to this tissue. — When the hæmorrhage is from the cutaneous surface, generally it assumes the form of a sanguineous sweat or perspiration. The situations to which it is most frequently limited, are — the face or cheeks, the anterior parts of the chest and armpits; the mammæ and mamillæ, the groins, the umbilicus; the palms of the hands and soles of the feet; and the heels, toes, and fingers. It may occur in these situations without any abrasion of the cuticle or change in the skin; but it also sometimes proceeds, both in these and in other parts, from ciactrices, nævi, or other alterations of structure.

60. Hæmorrhage from the cutaneous surface generally has been noticed by Beuerenius, Tulpius, Wepfer, Schenck, Garmannus, Ruysch, Lentin, Stahl, Pezold, and Richter; and a few cases of it are given in the *Ephemerides Academiæ Naturæ Curiosorum.* I never saw an instance of it. My learned and scientific friend, Dr. W. Hutchinson, informed me that, during his residence in the Ukraine, he had a fine Arabian horse, whose sweat, upon most occasions of exertion, was sanguineous; and was nearly pure blood upon great exertion. It was general, and unattended by any other sign of disease. — Hæmorrage from the *face* has been observed by Vogel and Pelisson. It has occurred in rare instances during epileptic convulsions: I saw a case of this kind. Discharges of blood from the *mammæ and nipples* are more frequent, and have been seen by Schenck, Amatus Lusitanus, Marcellus Donatus, Mercklinus, Vander Wiel, Panarolus, Paullini, Bierling, Hoffmann, Schurig, Trioen, Delius, Richter, Wegelin, Jacobson, and myself. Hæmorrhage from the *umbilicus* has occurred chiefly in young children, or during the first weeks or months of infancy. Cases of this kind have been noticed by Fabricius, Shuster, Radford, and others, and have generally terminated fatally. Mr. Pout has detailed a case which thus terminated, and which was the third in one family. Exudations of blood from the armpits, groins, and extremities, especially the fingers and toes, have been remarked by Wepfer, Zacutus Lusitanus, Mercklin, Hagendorn, Ash, Musgrave, Ab-Heers, Riedlin, Bartholinus, Orlovius, Whytt, and Thilenius. Hæmorrhage from cutaneous nævi, and from the cicatrices of ulcers, is not an infrequent occurrence, especially in females in whom the catamenia are suppressed. In this case it assumes the form of vicarious menstruation.

61. i. *Causes.* — Cutaneous hæmorrhages are evidently more or less connected with the state of the constitution and of the circulation. They have been seen at all ages, and more frequently in females than in males. They most commonly appear after the suppression or cessation of accustomed sanguineous or other discharges; more especially the menstrual. When they take place from the breasts, they often recur periodically,

and replace the catamenia. They are sometimes caused by great exertion, by violent emotions, by sudden terror or fright, and by great muscular efforts. Mayer states that he saw a case in which the hæmorrhage returned twice annually, about the equinoxes upon muscular exertion.

62. ii. The *Phenomena* attendant upon cutaneous hæmorrhage have not been closely observed or described. In some cases, where the exudation was partial, pain and redness of the surface preceded it. In others, the blood has issued from a greater or less extent of the skin, in a manner similar to the perspiration, of which it seemed to constitute a part. It has varied in deepness of colour and in fluidity, as well as in quantity. Upon wiping it off, the skin has presented no change of structure, and has continued still to exude the blood from its surface. The discharge has seldom been of long duration, although it has frequently recurred. Where it has been vicarious of menstruation, and has proceeded from the mammæ, or from nævi, or from a cicatrix, increased fulness, redness, and heat of the part has generally preceded it for a short time.

63. iii. The *Prognosis* of cutaneous hæmorrhage is generally favourable, when it is partial unless it be dependent upon internal disease. When it is general, it is not unattended by danger. The soft solids and the blood itself are then generally more or less in fault; and this seems to be not less the case when it has been caused by violent mental shocks or sudden frights.

64. iv. The *Treatment* should altogether depend upon the states of vascular action and vital power; and ought to be conducted according to the principles developed above. If the hæmorrhage has followed the suppression of an accustomed discharge, the restoration of this latter ought to be attempted. If it has proceeded from fright or moral emotions, antispasmodics, restoratives, and sedatives should be administered. If it be evidently passive, and very abundant, it ought to be moderated or restrained by tonic astringents, internally and externally prescribed.

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III. Hæmorrhage from the Nose.—Syn. Ἐπισταξις (from ἐπισταζω, I flow drop by drop); Αἱμοῤῥαγία, Hippocrates; *Hæmorrhagia*, Linnæus, Sagar, Sauvages; *Hæmorrhagia narinea*, Hoffmann; *Epistaxis*, Vogel, &c.; *Hæmorrhagia Narium*, *Sanguinis Stillatio*, *vel Stillicidium è Naribus*, Auct. var.; *Hémorrhagie nasale*, *Saignement du Nez*, Fr.; *Nasenblütfluss*, Germ.; *Bleeding from the Nose.*

65. Defin.—*The effusion of blood externally from the pituitary membrane.*

66. There is no part of the body more disposed to hæmorrhage, than the pituitary membrane; and none in which the recurrence of the discharge is productive of so little injury, as respects either this structure or the constitution. It is necessary to a due consideration of the pathological and therapeutical relations of epistaxis, to recollect, that this membrane is supplied by the external and internal branches of the common carotid arteries; and that its blood is returned partly into the external jugular veins, and partially, by anastomosing branches of veins, into the anterior veins and sinuses of the cranium. The blood effused from the pituitary membrane may be discharged either by the nostrils, or by the mouth after having passed into the posterior fauces. This latter very generally occurs when the patient is in a supine posture; it then not infrequently flows into the pharynx, and is swallowed. If the quantity of blood is great, which thus passes into the stomach, irritation of this organ, and of the intestinal canal, sometimes followed by vomiting of the blood—by a pseudo-hæmatemesis—or by melæna, not infrequently supervenes. On the other hand, blood may be discharged through the nostrils, without having been effused by the pituitary membrane. This occurs when a sudden or profuse hæmorrhage takes place from the pharynx, bronchi, or stomach; but it is not, and therefore should not be confounded with, epistaxis.

67. i. The *Phenomena of Epistaxis* are well known; but the signs of its occurrence, and the true pathological states ushering it in, are not so generally recognised or justly estimated.—*A.* The *precursory symptoms* vary much according to the grades of vital action, of local determination, and of general or local vascular fulness, preceding and attending it; and upon these pathological conditions entirely depend the hypersthenic, sthenic, or asthenic,—the entonic, or atonic,—the active or passive character of the hæmorrhage. In proportion as it partakes of a hypersthenic or sthenic form, the more manifestly will it be ushered in by one or more of the following symptoms;—by pain of the head or face; by vertigo, stupor, or somnolency; by frightful dreams, or restlessness; by redness or heat of one or both cheeks; injection of the eyes or lachrymation; by flashes of light before the eyes, or affections of the sight; deafness, or noises in the ears; increased strength of pulsation in the temporal or carotid arteries, and fulness of the veins; and by a sense of fulness,

tension, dryness, heat, or of titillation or itching of the nostrils. Not infrequently, especially in the more passive or asthenic states, the hæmorrhage occurs without any premonition, or merely after a slight touch or local irritation. The character of the pulse varies with the degree of vascular action and of vital power; and in proportion to the grades of both it is full, strong, and rebounding. According, also, as both action and power are weakened, the pulse becomes frequent, soft, compressible, open, small, and undulating. The older writers considered that a dicrotic or rebounding pulse indicated the occurrence of this, or of some other hæmorrhage; but no great dependence can be placed upon this symptom.

68. *B.* The hæmorrhage may take place from one or both nostrils; but in the latter case it is greater from one than the other. The quantity of blood discharged may vary from a few drops to many pounds; and, in the more obstinate passive states, the patient may be reduced to the utmost danger, or may be carried off in a few hours, or days, according to the continuance or violence of the discharge. In some cases, a fibrinous and more or less firm coagulum attaches itself to the part whence the hæmorrhage proceeds, and occasionally hangs out of the nostrils over the upper lip, or down into the posterior fauces. As long as this remains attached, the discharge continues suppressed; but when removed prematurely or otherwise, it returns, even with increased violence and danger. The disease may be *continued*, *remittent*, and recurrent, or *intermittent*. In this last case it may return irregularly or *periodically*.

69. *C.* The more active or simply *sthenic* epistaxis is often *symptomatic* or *critical* of several acute diseases, attended by increased action; especially the more inflammatory kinds of fever, and inflammations of the brain, or of the lungs, &c.—The *passive forms* are frequently *symptomatic* of several cachectic maladies; and of the last stages of malignant or low fevers.—Many writers, even as recent as the Franks, suppose that, in cases of epistaxis consequent upon enlargements or *obstructions of the liver*, or of the *spleen*, the hæmorrhage is generally upon the same side as the enlarged viscus.

70. ii. Causes. — *A.* Epistaxis occurs most frequently in children and young persons, especially in its more idiopathic states. It affects most commonly the sanguine, irritable, the plethoric, and florid; and those possessed of great talents, of delicate or relaxed fibres, of weak constitutional powers, and of much sensibility. After ten or twelve years of age, it is oftener observed in the male than female sex. It is not infrequent in males about the change to the decline of life; and then, as well as at later periods, often prevents more serious hæmorrhagic or inflammatory attacks. Epistaxis is also often dependent upon peculiarity of constitution or diathesis, and is consequently, often hereditary, or observed in several of the descendants of the same parents, or members of the same family.—At advanced ages, it is most common in those who live luxuriously and partake largely of wine or malt liquors. In the more mature periods of life, it is most frequently *symptomatic*, or dependent upon disease of the heart, of the liver, spleen, or of some other viscus; or consequent upon the disappearance of some sanguineous or other evacuation.

71. *B.* The *exciting causes* are extremely numerous and diversified; for whatever favours an increased flux of blood to the head, and to the pituitary membrane; or retards the return of this fluid from these parts; or occasions general plethora; or weakens the vital cohesion of this membrane, or the tone of the vessels ramified in it, may occasion hæmorrhage from it, when the predisposition already exists. — *a.* The *external causes* are — injuries; irritants or excitants inhaled into the nostrils; stimulating vapours or gases; fractures of adjoining parts; exposure of the face to fires or furnaces, or of the head to the sun's rays, either uncovered, or with a black or metallic hat or cap. — *b.* The *internal causes* are — whatever increases the flow of blood to the head, as anger, shame, or other states of mental excitement or mental disorder; protracted study, and great exertions of the mind; stooping, or a low or depending position of the head; frequent sneezing; catarrh; febrile, inflammatory, and exanthematous diseases; headachs, and rheumatic affections of the face; — whatever retards the return of blood, as deep sighs, exertions of the voice, laughing, singing, crying, &c.; playing on wind instruments; severe cough or difficulty of breathing; sudden terror; disease of the heart or adjoining large vessels; tumours pressing upon the jugular veins, or other causes of obstruction to the circulation in them, or in the subclavians; congestion of the lungs; neckcloths or collars worn too tightly around the neck, &c; — whatever causes absolute or relative plethora, as too full living, the ingurgitation of large quantities of wine, or other exciting liquors; the suppression of accustomed evacuations, especially the catamenial and hæmorrhoidal, &c.; — whatever interferes with the equal distribution of the blood, as wearing tight clothes or corsets, obstructions in any of the large viscera, the gravid uterus, excessive distension of the stomach or bowels, or enlargement of the spleen, epileptic or convulsive seizures, cold applied to the extremities, suppression or retention of the natural discharges, and unnatural positions of the body; — whatever weakens the tone of the vessels in the pituitary membrane, and diminishes the crasis of the blood, as the advanced states of low fevers, scurvy, and other cachectic maladies, frequent returns of the complaint, &c; — whatever determines the blood to the superficial parts of the body, as diminished pressure of the air, high range of atmospheric heat, &c. The epidemic prevalence of epistaxis (which is of very rare occurrence) may be attributed to this last cause. (See Morgagni, *Epist.* xiv. ch. 25.)

72. *c.* The blood is chiefly exuded from the capillaries of the pituitary membrane, as in hæmorrhages from other mucous surfaces: but the question frequently agitated, as to whether it proceeds from arterial or venous capillaries can hardly be solved; nor does it deserve the trouble of inquiry. J. P. Frank observes, that he has frequently seen a varicose state of the veins after cases of chronic epistaxis. The more important considerations as to the pathology of the disease, are those which relate — 1st, to the states of vascular action, and vital tone attendant upon it; — 2d, to the constitution and habit of body of the patient; — 3d, to previous attacks of hæmorrhage, either from the nose or from other parts; — 4th, to antecedent and associated disorders, or to ten-

dencies to be affected by dangerous maladies, as apoplexy, palsy, hæmoptysis, phthysis, &c.; — 5th, to the causes, predisposing and exciting; — 6th, to the probable consequences of an immediate arrest, or of a continuance, of the discharge; — and, 7th, to its critical influence.

73. iii. The Prognosis should have more or less reference to the circumstances just enumerated. It is generally favourable, when the disease occurs in children, or persons about the age of puberty, who are otherwise healthy; but, if epistaxis affect the cachectic, the strumous, those who have evinced a tendency to affections of the lungs, or of the glandular and lymphatic system, or those labouring under disease of the heart, lungs, or spleen, or who are aged, the prognosis ought to be more guarded, inasmuch as the hæmorrhage may be difficult to restrain; or, when arrested, it may return; or may be followed by still more serious results, as by hæmoptysis, or by an aggravation of the associated malady, or by fatal syncope upon using exertion, or assuming a sitting posture. The more sthenic the epistaxis, the less the risk from it, unless it be prematurely restrained. But when it is manifestly asthenic, and copious — if the means of cure fail, and if the blood is thin, dark, or does not coagulate — if the powers of life sink, and the skin and lips assume a pale or waxy hue, the prognosis should be unfavourable, in proportion to the prominence of these changes.

74. In persons who have arrived at, or passed, middle age, the above circumstances (§ 72.) and considerations should, especially, have due weight; and even the contingencies of the attack — whether suppressed, or allowed to continue as far as the immediate safety of the patient will warrant — ought to be fully estimated. Where disease of the heart, especially passive dilatation of one or more of its cavities, or attenuation of its structure, or a disposition to apoplexy or palsy, or engorgement of the liver or spleen, exists, an opinion of the immediate or ultimate consequences should be stated with caution.—When slight epistaxis takes place in the plethoric, or in those addicted to indulgences at table, the circumstance ought to be viewed as indicating the danger of the habit, and the probable occurrence hereafter of apoplexy or palsy, if a more spare diet and suitable regimen be not observed. In forming an opinion of the terminations of nasal hæmorrhage, the remote consequences of the continuance or suppression of it upon related organs should be considered, in connection with the causes and the accompanying phenomena. When the epistaxis appears as a salutary evacuation of an overloaded vascular system — when it has been caused by full living or intemperance, or preceded by headachs, noises in the ears, injected eyes, affections of any of the senses, &c.— the prognosis ought to have reference chiefly to the cerebral disease which it has averted; and the indications which it has evinced should not be lost upon the practitioner, nor upon the patient.

75. iv. Treatment. — *a.* Upon visiting a patient with epistaxis, the first glance will often enable the practitioner to decide whether or not he ought to arrest it without delay. When the countenance does not at first furnish sufficient grounds for immediate determination, inquiries ought to be made as to the age, constitution, habits, and previous ailments of the patient; the causes which occasioned the attack; the symptoms ushering it in, and attending it; the quantity and appearance of the blood discharged; and the existing indications of internal disease; in order that a safe conclusion may be arrived at as to this and other parts of the treatment. When one or more of the following circumstances appear at all prominent — if the patient be robust or plethoric; if he have lived fully, and drank wine or malt liquors freely or daily; if he have experienced active disease in the head, or attacks of congestion, or determination of blood to this part; and if headach, redness of the eyes or face, increased heat of the scalp, throbbing of the vessels, or a beating noise in the ears, have ushered in the attack, and more especially if they still attend it; the discharge should not be arrested until the vascular system is relieved; and when this is accomplished, the epistaxis will cease of itself. If it should seem to cease prematurely, and particularly if the above symptoms still continue, depletions, purgatives, and an antiphlogistic regimen ought to be prescribed.

76. *b.* When it is desirable to arrest the discharge, the means of cure should be directed with the *intention* — 1st, of deriving the current of circulation from the seat of hæmorrhage; and, 2d, of constringing the capillaries of the pituitary membrane. With these views, the patient ought to be placed in a cool and airy apartment, with the head elevated, or held upright, and the feet plunged in warm water. The neck should be bared, and *cold* fluids aspersed over it and the face, or cold substances applied upon the nape, or upon the forehead. If these fail, evaporating or iced epithems may be placed over the whole of the head, or the cold effusion may be directed to this part, and an active cathartic exhibited. The most appropriate *cathartics* in such cases are calomel with rhubarb or jalap, and the spirits of turpentine with castor oil; but a full dose of the latter may be given in two or three hours after the former has been taken.—*Emetics* have been advised by Stoll; but they ought not to be given early in active epistaxis. They are most serviceable when the attack has been induced by an overloaded stomach.

77. *Bleeding* is required chiefly in the circumstances just alluded to (§ 75.), and in the more sthenic forms of the disease; but it should not be neglected, in these circumstances especially. It may be necessary to repeat it, even oftener than once, and after longer or shorter intervals. The older writers recommended bleeding from the feet; and many modern Continental practitioners order leeches to be applied to the anus or to the vulva, when the epistaxis has arisen from the suppression of the hæmorrhoidal or catamenial discharge. When it has become habitual, or periodic, and especially if it be vicarious of menstruation, the recurrence of the discharge may be anticipated by the application of leeches to the tops of the thighs near the groins; by aloëtic purgatives; by the semicupium or hip-bath; and by the exhibition of emmenagogues, especially borax, with the aloes and myrrh pill. In other circumstances, *cupping* over the nape or mastoid processes is preferable to other modes of vascular depletion. When the quantity of blood discharged is too great to admit of the loss of more, *dry-cupping* in the former situation should not be over-looked. — In the great majority of cases, however, the

sitting posture, with the head held backwards; *cold* applied to the face; or a piece of cold metal placed between the nape of the neck and the clothes; and cooling drinks, especially those with *acids, nitre,* &c.; will be sufficient to arrest the discharge.

78. *c.* When active epistaxis has proceeded so far as to require to be arrested, and has still continued, notwithstanding the foregoing means, the treatment then called for is also appropriate to the *passive* or *atonic states* of the disease. In these circumstances, the chief reliance must be placed upon astringents, applied to the pituitary membrane, and taken internally with tonics; upon pressure made locally; and upon the insufflation of substances into the nostrils, that may promote the coagulation of the effused blood. A solution of the acetate of lead, or of the sulphate or acetate of zinc, or of the sulphate of iron or of copper, or of the sulphate of alumina, or of the vegetable or mineral acids, or of the pyroligneous acid with kréosote, or of any of the numerous vegetable astringents (§ 40. 45.), may be injected into the nostrils; or lint, moistened with either of them, introduced; but whilst astringents are being used locally, the exhibition of them internally should not be neglected. The superacetate of lead, with acetic acid, and small doses of opium, may be given internally; or other astringents may be taken with tonics; or small doses of spirits of turpentine resorted to, in the manner above recommended (§ 41.).

79. Finely levigated astringent powders, especially those of alum and of gall-nuts, may be blown through a quill into the nostrils; or substances of a glutinous nature may be employed in this manner, particularly powdered gums, as tragacanth or acacia; or astringents may be conjoined with these. Finely powdered charcoal may be employed in the same way. Pungent or irritating substances are often of less service than the powdered gums, which will, without exciting the Schneiderian membrane, favour the coagulation of the blood on its surface. Plugging the nostrils with lint moistened with some astringent solution, is sometimes successful; but when the hæmorrhage proceeds from the more posterior parts of the nares, it will fail, unless the lint be pushed so far backwards as to reach nearly to the pharynx. Care, however, ought to be taken that it does not irritate this part. — J. P. Frank advises a piece of the intestine of a pig, closed at one end, to be introduced into the nostrils, and injected with a cold fluid. — Some writers recommend thick mucilage, others a paste with charcoal or with astringents, and others the white of egg, to be conveyed into the posterior nares, in order to coagulate the effused blood. — When a coagulum has formed, either spontaneously, or by any of the foregoing means, it ought not to be disturbed for three or four days, or even longer, lest the hæmorrhage return.

80. *d.* Besides the above measures, others have been advised.—In order to derive from the seat of hæmorrhage, Zacutus Lusitanus directs the cautery to the lower extremities; Chrestien, warm pediluvia, with mustard flower put into the water; Borelli, bruised nettles to the feet and hands; Niemann blisters to the nape, and Cheza to the arms; Riedlin, the exhibition of active cathartics; and Cælius Aurelianus, cupping on the occiput, Galen on the hypochondrium, and Forestus on the extremities. With the view of constringing the extreme vessels, cold drinks are prescribed by Hoffmann; cold injections through the nostrils, by Morand and Morgagni; the immersion of the head in cold water, by Darwin; cold glysters, by Leuthner and Andriéu; and cold applications to the genitals, by Diemerbroeck, Theden, and Mercier. In addition to the local astringents already noticed, powdered agaric is recommended by Rochard; writing ink, by Riedlin; lemon juice, by Blankard; and spider's web, with vinegar, by Chesneau. The introduction of plugs moistened with spirits of wine is directed by Morgagni and Rath, and with the expressed juice of the common nettle, by Prævotius; and plugs consisting of dough, or chalk-paste, by Avicenna and Diemerbroeck. The injection of a strong solution of isinglass is prescribed by Lentin; and carded lint, drawn or pushed into the posterior nares, is employed by Audouin.

81. The internal use of the acetate of lead, with opium, is advised by Reynolds and Latham; of the phosphoric acid, by Herder; of the aromatic sulphuric acid, by Hufeland; and of the ergot of rye, by Spajrani, Cabini, Ryan, and Negri.—The first of these may be employed in either the active or passive states of the disease; but the phosphoric acid is admissible only in the latter. In passive epistaxis, camphor with opium; the spirits of turpentine, in small and frequent doses, with aromatics and restoratives; the chlorates of potash or of lime; the sulphate of quinine with camphor, &c.; assafœtida with myrrh, and opiates in small quantity (Sydenham), are amongst the most energetic medicines that can be taken internally; but external means ought also to be resorted to.

82. *e.* If epistaxis be vicarious of menstruation, the return of an attack should be prevented only by endeavouring to restore the catamenial discharge. If it be periodic, especially in persons who have suffered from agues, congestion or enlargement of the liver or spleen should be dreaded; and if either be found to exist, deobstruent purgatives, followed by tonics, particularly quinine or the other preparations of cinchona, or Fowler's solution of arsenic, ought to be prescribed; but local depletions should be freely employed previously to these, whenever the liver is the seat of such disorder. When epistaxis occurs in aged persons, either the early suppression of the discharge, or its continuance, may be followed by serious results. It is generally connected with a disordered state of the circulation within the cranium in such cases. What has been stated above will indicate the circumstances in which it will be advisable to interfere; but repeated blistering behind the ears, in some instances cupping in this situation, a seton in the nape, and other measures which the peculiarities of the case will suggest, with a suitable regimen, ought not to be neglected.

83. *f.* If the hæmorrhage from the nares seems to be *critical*, the observations offered in the article Crisis are altogether applicable. When it appears in the last stage of low fevers, or in scurvy, or in purpura, and is merely the consequence of the lost tone of the extreme vessels, with diminished vital cohesion of the mucous surfaces, and a deteriorated state of the blood, the treatment directed for the passive form of epistaxis, or

for putro-adynamic fever, is quite appropriate, if the discharge be so considerable as to require measures to be adopted for it.

84. *g.* The *after-treatment* of epistaxis is often of great importance, especially in persons of middle or advanced age. An attack, whether slight or severe, in those who live fully, ought to be followed by an antiphlogistic regimen. Where the discharge has prematurely ceased, bloodletting should always be prescribed. In order to derive permanent advantage from this treatment, abstinence, regular exercise in the open air, and a due subjection of the mental emotions, ought to be constantly observed. How fatally this may be neglected, is shown by the following case: — A gentleman, aged about 50, of a very full habit of body, accustomed to live richly, and to take his wine freely, but not in excess, became subject to severe headachs. He afterwards had an attack of epistaxis, which continued until the loss of blood was very great, although means were used to arrest it. He recovered, and remained well for many months; yet his usual diet and regimen were persisted in. His headachs, as may have been expected, returned; he became depressed in spirits, and disliked society; but no appropriate treatment was prescribed—or, at most, aperients only were directed. The indications furnished by the epistaxis were entirely lost upon the patient and his medical attendants — abstinence was not adopted by the former, nor precautionary bloodletting by the latter. The consequences may be readily anticipated. He shortly afterwards was struck with apoplexy associated with hemiplegia; for which I was consulted just before his death.—This is, however, not the only instance of the kind which has come before me in practice. I could state the particulars of several cases in which the neglect of the indications afforded by epistaxis, has been followed by apoplexy, palsy, epilepsy, mania, and inflammation of the brain and its membranes.

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IV. Hæmorrhage from the Mouth and Throat.

— Syn. *Hæmorrhagia Oris*, *H. Faucium*, *Stomatorrhagia*, J. P. Frank; *Sanguinis Profluvium ex Ore*, *Hæmorrhoides Oris*, Vogel; *Hæmorrhagie buccale*, Fr.; *Mundblütfluss*, Germ.

85. *A discharge of blood from one or more of the parts forming the mouth and throat.*

86. Hæmorrhage may take place to a great, or even fatal, amount, from the gums, the tongue, the fauces, or the pharynx; and even from the insides of the cheeks and lips. Blood is rarely, however, discharged from one or more of these parts, unless in the advanced stages of cachectic diseases, or of malignant or low fevers. — *a.* Riverius mentions a case in which four or five pounds of blood were discharged from the *lips* every month. Hæmorrhage from this part has been observed also by Zacutus Lusitanus. J. P. Frank met with a case in which it proceeded from varicose veins of the upper lip. I lately saw an instance of varicose veins of this part, but there was no hæmorrhage. Bleeding from the interior surface of the *cheeks* is generally owing to injury from the teeth, or to tumours.

87. *b.* Discharges of blood to a small amount from the *gums* are very common, especially in the advanced stages of the diseases just adverted to; and more abundantly after suppression of accustomed discharges, as the catamenial or hæmorrhoidal. Vicarious menstruation may even take place from this situation. Severe or dangerous hæmorrhages from the alveolar processes have been most frequently caused by the extraction of teeth. Frank has seen several pounds of blood lost from a varicose state of the veins of, and in the vicinity of, the gums: and similar discharges have more frequently taken place from tumours in this situation, and from the excessive use of mercury. Vogel met with an instance in

which the discharge was produced by a combination of mercury and belladonna. Hirsch, Frank, and others, have met with periodic hæmorrhage from this part, vicarious of menstruation. Fatal effusions from the gums have been seen by Horstius, Fabricius Hildanus, and several more recent writers.—The occurrence of hæmorrhage in this situation in purpura hæmorrhagica, scurvy, and the diseases adverted to above (§ 86.), is too well-known to require further notice.

88. *c.* Hæmorrhage from the *tongue* very rarely takes place to any very considerable amount, unless in cases of injury of the raninal veins or arteries, as in dividing the *frænum linguæ*, when it may prove fatal. Slighter injuries from the teeth, especially during epileptic fits, seldom cause more than small discharges of blood. But the more serious diseases to which the tongue is liable (see art. Tongue) may be followed by dangerous or even fatal hæmorrhage. Such instances are recorded by Plater and others. Mari saw 24 lbs. of blood discharged from this part; and J. P. Frank met with a case of *glossitis*, which, upon passing into gangrene, terminated fatally with profuse hæmorrhage.

89. *d.* Hæmorrhage from the *palate* and *fauces* to a very considerable amount has been observed by Bundl, Vogel, Frank, and Kluige. J. P. Frank believes it generally to proceed from a varicose state of the veins in this situation; and hence the appellation, *Hæmorrhoides Oris*, applied to it by Vogel and Bundl. He mentions an instance in a young man, who, for many years, suffered repeated attacks of hæmorrhage from this state of the veins of the palate; and who was permanently cured, after a profuse discharge, by a strong solution of alum. Portal met with a case where the hæmorrhage took place from the *uvula*.—A more or less copious effusion of blood may also proceed from the *velum palati* or *tonsils*, especially in the course of cachectic diseases, or as a consequence of a varicose state of the veins of the part, or of those in the vicinity.

90. *e.* Effusions of blood from the surface of the *pharynx* occur more frequently than is commonly supposed, and are overlooked in consequence of the fluid having passed into the stomach. When the hæmorrhage from this situation is very considerable, the quantity of blood which is swallowed is often so large as to cause vomiting, and to lead to the supposition that the stomach is the seat of the disease. The small veins in the pharynx are not infrequently varicose or obstructed; and when this is the case, hæmorrhage sometimes takes place from comparatively slight causes. The most dangerous discharges from this part occur in the advanced stage of putro-adynamic fevers, and of cynanche maligna, in which the pharynx is more or less affected. J. P. Frank has noticed the occasional supervention of pharyngeal hæmorrhage independently of those diseases: but the subject has been overlooked by other writers. Some years ago, I attended a lady, about 70 years of age, residing at St. John's Wood, who complained of dyspeptic disorder complicated with psoriasis and sore throat. The veins of the pharynx were reticulated and varicose. I was afterwards called to her suddenly on account of a very severe hæmorrhage, attended by vomiting and cough. Much of the blood evidently was brought up from the stomach, but a great part passed directly from the throat. The cough arose from the irritation caused by the fluid on the epiglottis and pharynx. The effusion was arrested for a time by powerful astringents. Two days afterwards, the hæmorrhage returned more violently than before, and terminated life before I reached her. On examination after death, the pharynx was found softened, black, and studded with soft aphthous ulcerations, between which dark blood was infiltrated. The veins of this part were numerous and dilated. The stomach contained a considerable quantity of blood. The upper part of the œsophagus was softened and congested in its internal surface. In this case, the blood had passed into the stomach, the position in bed having favoured this occurrence, and had irritated this organ so as to produce vomiting.

91. i. The Symptoms and Diagnosis of hæmorrhage from the mouth or throat are not always as distinct as may be supposed, particularly as respects the source of the discharge. The symptoms preceding the effusion are very uncertain; and are those most commonly indicating congestion of the head or adjoining parts, or disease in one or other of the above situations. Headach, vertigo, noises in the ears; soreness, irritation, titillation, tension, or a sense of fulness or heat in the throat; a bloated appearance of the countenance, and throbbings of the vessels in the vicinity, sometimes usher in the hæmorrhage. If the patient be in bed when attacked, the irritation of the fluid on the glottis causes *cough*; and the passage of it into the stomach is followed by *vomiting*, when the quantity is considerable, or the stomach irritable. If hæmorrhage take place from the pharynx whilst the patient is asleep, the blood will flow into the stomach; and the first intimation of the occurrence will often be the vomiting of blood. Hence the utmost care is required to distinguish this species of attack from *hæmoptysis* on the one hand, and from *hæmatemesis* on the other, as it may closely simulate either. In order to do this, the mouth ought to be well washed by a slightly astringent and colourless fluid, or the throat gargled, and afterwards carefully examined. If the hæmorrhage be too copious to admit of inspection of the mouth and throat, the patient should lean forwards, so as to allow the blood a free passage from the mouth; and if it flow without coughing or retching, and is neither frothy or very florid, nor very dark or grumous, there can be no doubt as to the situation whence it proceeds. If the patient feel it collect in the throat, and create a disposition to deglutition, or if he require no effort to bring or hawk it up, it manifestly proceeds from the fauces or pharynx.—In many instances, causing the patient to drink some fluid instantly before examining the throat will assist the diagnosis; and in others, the history of the case will be sufficient to settle the question.—When the fauces or pharynx is the seat of the discharge, deglutition of food or drink, or the use of a gargle, either before or during the hæmorrhage, will cause more or less pain. (See *Diagnosis* of Hæmoptysis and Hæmatemesis.)

92. ii. The Causes of stomatorrhagia are those of hæmorrhages generally; but more especially, previous diseases of a cachectic or malignant character; affections of the gums and teeth; repeated attacks of sore throat, particularly when connected

with chronic disorder of the stomach and other digestive organs; the use of mercury; injury or previous lesion of the vessels, especially the veins; and obstructed discharges, as the catamenial or hæmorrhoidal, of either of which, the hæmorrhage from the mouth may be vicarious.—The acronarcotic poisons may even cause it. In a case of poisoning by aconitum, which I saw some years ago, remarkable swelling of the tongue and fauces took place, followed by moderate hæmorrhage from these parts.

93. iii. The Prognosis entirely depends upon the circumstances in which stomatorrhagia occurs — upon the previous state of disease, and upon the quantity of blood lost, and the effect thereby produced upon the constitution. The general principles above stated will also guide the practitioner.

94. iv. The Treatment of hæmorrhage from the mouth or throat requires to be materially modified, according to the parts from which the blood is effused, and the causes producing the effusion. Cases rarely occur, in which it is either necessary or proper to have recourse to bloodletting. Purgatives, however, especially those of a stomachic or tonic kind, are often beneficial — more particularly when the disease is connected with disorder of the digestive organs, and with accumulations of morbid matters in the *primæ via*. The chief dependence is to be placed in the local and internal use of the more energetic astringents noticed above — as the sulphates, the acetic acid with kréosote, the acetate of lead or of zinc, spirits of turpentine, the chloride of lime, &c. These may be used in gargles — in more or less concentrated solutions — and in various states of combination, as with gums or mucilages. If the hæmorrhage take place from a single vessel, or from a limited extent of surface, the actual or potential cautery is quite appropriate. If it proceed from the alveolar process, powerful styptics, and various mechanical measures, may be resorted to.

95. When hæmorrhage from the mouth depends upon general cachexia, or supervenes in the latter stages of putro-adynamic fever, or of purpura or scurvy, the above means should be aided by the internal use of tonics, conjoined with vegetable or other astringents and antiseptics, as the chlorides, the chlorate of potash, the nitrate of potash, or the muriate of ammonia, &c., and by an appropriate regimen.—If the effusion seems to proceed from the pharynx, the position of the patient should be such as will favour the flow of the blood from the mouth, and prevent it from irritating, or escaping into, the larynx.

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V. Hæmorrhage from the Respiratory Organs.

— Syn. *Hæmoptysis* (from *αἶμα*, blood, and *πτυω*, I spit, or *πτύσις*, a spitting); *αἱμοπτυσις*? *αἱμοπτυϊκος*, Galen, Dioscorides; *Sanguinis Sputum*, Celsus; *Emoptoë*, Gordon; *Sputum Cruentum*, *Cruenta Expuitio*, *Sanguinis Fluor*, *Vomitus Pulmonis*, Auct. Lat.; *Emoptoïca Passio*, Gilbert; *Passio hæmoptoïca*, Plater; *Hæmoptoë*, Boerhaave, Vogel, Darwin; *Hæmotismus*, Auct. var.; *Hæmoptysis*, Sauvages, Vogel, Cullen, &c.; *Hæmorrhagia Pulmonum*, *Hæm. bronchica*, *Hæmorrhœa pulmonalis*, Auct. var.; *Pneumonorrhagia*, J. P. et J. Frank; *Blutspeyen*, *Bluthusten*, *Lungenblutfluss*, Germ.; *Crachement de Sang*, *Expectoration de Sang*, Fr.; *Emotisi*, *Emotisea*, *Sputo di Sangue*, Ital.; *Blodspyting*, Dan.; *Pulmonary Hæmorrhage*, *Spitting of Blood*, *Coughing of Blood.*

96. Defin.—*After a sense of heat, oppression, or pain in the chest, and titillation in the throat, the rejection of florid, frothy, or pure blood, from the bronchi or lungs, with a hawking or short cough.*

97. *Hæmoptysis* is one of the most frequent varieties of hæmorrhage, owing to—(*a*), the very extensive bronchial and vesicular surface to which the blood is circulated for the purpose of undergoing the requisite changes during respiration; (*b*) to the delicate conformation of the capillaries and mucous membrane of this part; (*c*), to the liability of the lungs to congestions, from impaired organic nervous power, from obstructions of the pulmonary veins and of the circulation through the left side of the heart, and from tubercular or other lesions of the substance of the lungs; (*d*), and to the liability of this organ to derangements of its circulation from hypertrophy and other lesions of the heart, and from alterations of the large vessels. — Of all these morbid causes and connections, tubercular formations in the lungs are the most common, either as a cause of the hæmoptysis, or as associated lesions consequent upon the same antecedent changes in the states of vital power and vascular action, or as both.

98. i. Symptoms, &c. — *A.* The *premonitory signs* of hæmoptysis are — horripilations, passing redness and heat of the face, or flushings of the cheeks, headach, coldness of the extremities, with a collapsed or empty state of the veins of the surface; lassitude, and sense of weight of the limbs; occasionally cramps or spasms of the lower extremities; a feeling of internal warmth, particularly in the chest; pain or tension at the epigastrium or hypochondria; a burning sensation under the sternum, with more or less anxiety, inquietude, constriction, or oppression at the chest, or dyspnœa; a short, dry cough; dyspnœa, or shortness of breath, on slight exertion; a dull pain or soreness under the sternum, between the shoulders, or beneath the clavicles; palpitations; a quick, hurried, or excited pulse, which is sometimes also hard, full, bounding, or oppressed, &c.; flatulence, or borborygmi, costiveness, and pale urine. A few only of these symptoms, or several variously modified, may be present in individual cases; they may exist for a longer or

shorter time before the attack. In some instances, neither cough, nor difficulty of breathing, nor any symptom referrible to the chest, has been complained of; or it has existed in so slight a degree as to escape the observation of the friends of the patient; and yet the most extensive changes had taken place in the lungs, and caused the hæmorrhage. A case of this kind was attended by Mr. Bushell, Dr. Clark, and myself, whilst this article passed through the press. Such instances, however, are not uncommon, as shown by Rhodius, Müller, Wedel, Gramberg, the Franks, Louis, Clark, and others.

99. *B. Progress.* — As the blood rises to the larynx, a sense of titillation is felt in the trachea, or of irritation in the throat, with dyspnœa; and a gurgling or bubbling sensation in the chest or trachea; and the blood is either hawked or coughed up, exciting a sweetish-salt taste. As soon as this occurs, much alarm is sometimes caused, particularly in delicate or nervous persons; and several of the general symptoms, particularly those connected with the action of the heart and pulse, are owing chiefly to this circumstance. When the blood is in considerable quantity, the discharge of it is attended with a feeling of suffocation; the chest is forcibly dilated, a convulsive reaction or cough follows, and this fluid is ejected from both the mouth and nostrils. In some instances, the irritation at the top of the pharynx, and in the fauces, excites retchings; and in others, the blood, as it collects in the pharynx, is instinctively swallowed; and, when it has accumulated in the stomach, causes vomiting; and gives rise to a suspicion, from this circumstance, and from the presence of portions of ingesta, &c. as shown hereafter (§ 118.), that the hæmorrhage is seated in the stomach. Occasionally the blood is brought up without any effort whatever, beyond a strong expiration, which it accompanies in a full stream; and when retching or full vomiting is occasioned in the manner just stated, another and often a greater discharge of blood from the lungs attends it.

100. The quantity thus discharged, varies from a few drops to many pounds. Rhodius (*Obs.* cent. ii. 31.) saw 23 lbs. lost in three hours; Pezold (*Obs. Med.-Chir.* No. 49.) and Zacchiroli (Weigel's *Ital. Biblioth.* b. iii. p. 154.) observed larger quantities during a much longer period. J. Frank (*Prax. Med. &c.* ii. 2. 1. p. 417.) had a patient who lost 192 ounces in twenty-four hours; and a friend of my own experienced nearly as great a discharge in the same time, and afterwards recovered. When the blood is not considerable as to quantity, it is frothy or contains bubbles of air, and is of a florid hue; when it is very abundant, it is fluid, generally more or less florid, but not frothy: it is seldom mixed with muco-puriform matter, unless it be small in quantity, and it then is often semi-coagulated, and of a darker or brownish tint; but, towards the termination of an attack, this appearance is very common. — If the hæmorrhage is very great, extreme faintness, or even full syncope, may come on: but a sense of depression, or sinking, with a quick, sibilous, and short respiration; a small, weak, interrupted voice and speech; and coldness of the extremities; are more commonly complained of. Occasionally, the least exertion of the voice, or of the body, or a fit of coughing, increases or brings back the discharge; but as often it returns without any such cause.

101. In some instances, the attack is followed by great frequency of the pulse, and generally excited vascular action, with heat of skin, thirst, &c.; although the pulse had been perfectly natural before or at the time of seizure. In these, the congestion of the substance of the lungs connected with the production of the hæmoptysis has passed into inflammatory action, in one or several parts of the organ; or rather, the infiltration of a portion of the effused blood through the smaller bronchi has excited inflammation of them, as demonstrated by the sthethoscope and by dissection. In many cases, especially when the hæmorrhage occurs in weak or lax frames, and scrofulous or tubercular state of the lungs, not only the external discharge of the blood, but also its passage along the bronchi into the more depending parts of the organ, and even its infiltration into the substance of the lungs, or its effusion in the distinct form of pulmonary apoplexy, takes place, as I have several times recognised during life, and ascertained afterwards by dissection.

102. An attack of hæmoptysis may be so severe and sudden as to suffocate the patient before a large quantity of blood is lost; or so continued as to destroy life by the loss of this fluid. Only one violent seizure may occur — the patient recovering perfectly, without suffering materially, after the immediate effects have passed off: but this is seldom the case; more or less disease of the lungs, although unapparent to the friends previous to the attack, following rapidly afterwards. In some instances, particularly when tubercles have proceeded to softening, &c. without exciting much disorder, the hæmorrhagic congestion, infiltration, and atonic inflammation of the substance of the lungs, attendant and consequent upon the seizure, soon destroys life. In several instances to which I have been called, the patients had pursued their usual avocations unconscious of ailment, been attacked by hæmoptysis, and died in three or four weeks afterwards in consequence of these associated lesions of the lungs. In the case above alluded to (§ 98.), death took place 26 days after the attack. More frequently the hæmoptysis is followed by pulmonary consumption in a much less rapid form. When the blood is ejected in small quantity, or of a brown colour, or is mixed with a rose-coloured lymph, or mucus, latent inflammation or active congestion most likely will be found to exist in the substance of the lungs; and this inference ought not to be doubted, if febrile symptoms, with cough, be present, or if the blood taken from the arm be buffed. — In a few instances, the lymph effused from the vessels towards the close of the attack, is moulded into the form of several bronchi, and is expectorated in this state; in others, cretaceous or other earthy concretions, consequent on the degeneration, or the partial absorption, of tubercles, or even ossific matters, are brought up with the blood, or soon afterwards; but most frequently, and especially when the hæmorrhage is scanty, or towards its close, or after more than one attack, muco-puriform matter, with or without minute portions of softened tubercular substance, may be detected; and these become more manifest as the blood disappears.

103. Hæmoptysis may recur at irregular, or even at distant, periods; the patient experiencing but little ailment in the intervals, or presenting merely a marked susceptibility to congestion or inflammatory affections of the lungs. When supplemental of suppressed or retained catamenia, or of the disappearance of hæmorrhoids or epistaxis, it sometimes returns periodically. In such cases, the evacuation depends more upon vascular plethora, than upon serious lesion of the substance of the lungs, although this may also exist. — Some instances of a constitutional recurrence of hæmoptysis (§ 49.) have been observed, and yet a far advanced age has been reached.

104. *C. The appearances after death* comprise almost every lesion to which the lungs, heart, and large vessels are liable, but some of them are more immediately connected with hæmoptysis than others. — *Tubercles* are the most common of all these, in one stage or other of their progress, and frequently they are found in every stage even in the same case — either disseminated through the lungs or clustered — in a crude, softened, and ulcerated state — in connection with small or large excavations, — in some instances, the seats of the softened and partially absorbed tubercular matter containing earthy or cretaceous concretions; and, in rarer cases, the parenchyma of the lungs around them presenting a cicatrised or puckered appearance. When hæmoptysis has been very recent, the lungs are frequently more or less congested, and their substance infiltrated with dark blood, both throughout many of the minute bronchi and cells, and in the connecting cellular or parenchymatous tissue, large portions of the organ exhibiting a spleen-like appearance. In some cases, portions of the lungs are more or less obviously inflamed; the inflammatory appearances having been either antecedent to, or consequent upon, the hæmorrhage, most frequently the latter. In rarer instances, blood is effused in the substance of the organ, forming a distinct cavity filled with coagulated blood.

105. Adhesions between the pulmonary and costal or diaphragmatic *pleura*, both old and recent, frequently exist. The bronchial membrane is generally injected, congested, and of a deep or dark red, or purplish or nearly black, either throughout a large extent, or in parts or patches; but the state and colour of this surface vary with the period at which hæmoptysis took place, and the mode in which the disease of the lungs terminated the life of the patient. (See art. Bronchi, § 3—14.) In rarer cases, gangrene of portions of the lungs, or erosion or ulceration of one or more vessels connected with softened tubercles or cavities, is observed. These cavities are generally lined with a more or less thick secreting membrane. In a few instances, osseous deposit has been found in the membrane of the cyst. (See art. Lungs.)

106. Alterations of the large vessels in the chest, and of the heart itself, are occasionally found, especially in the cases of aged persons. The pulmonary veins have been seen diseased, inflamed, or partially obstructed by humours, or morbid depositions, either externally or internally. I found them inflamed, and a large branch partially obstructed by lymph, in one case. A dilated or varicose state of the pulmonary veins has been noticed in connection with hæmoptysis, by Morgagni, Gillibert, Portal, and J. Frank. Lesions of the pulmonary artery have also been met with, especially *rupture* (Matani, *De Aneurism. Præcordior. Morbis*, p. 120.) and aneurismal dilatation (J. Frank, &c.). Mr. Semple has detailed a case, which he considered hæmatemesis, but which was probably hæmoptysis attended with vomiting, owing to the circumstances above pointed out (§ 99.), wherein the left pulmonary artery was obliterated, and the lung was extensively diseased. Aneurisms of some part of the aorta opening into the trachea, bronchi, or lungs, has been oftener observed than these. Cruickshanks found the lymphatics of the lungs turgid with blood, absorbed from the air-cells, in patients who had died of hæmoptysis.

107. Diseases of the heart, particularly such as occasion obstructed circulation through the left cavities, as narrowing of the auriculo-ventricular opening, lesions of the valves, &c., are not infrequently found in connection with hæmoptysis (Wilson, Watson, &c.). Hypertrophy of the ventricles, especially of the right ventricle, has been remarked, in rare instances. Bertin, Bouillaud, and other French writers, attach considerable importance to this lesion as a cause of the hæmorrhage; but I agree with Dr. Watson in considering the alterations which obstruct the passage of blood from the lungs as more frequent causes than this.

108. ii. Causes. — *A.* The *Predisposing Causes* of hæmoptysis comprise most of those already enumerated in connection with *hæmorrhage generally* (§ 21.), and of those which favour the formation of *tubercular consumption*. (See that article.) Those which are more especially concerned in the production of hæmorrhage from the respiratory organs are — Hereditary constitution; the scrofulous and the hæmorrhagic diathesis; sanguineous, irritable, and sanguineo-irritable temperaments; a plethoric habit of body; the period of life between seventeen and thirty-five; tallness of stature; a narrow or deformed chest; curvatures of the spine, rickets, or severe hooping cough in early life; sedentary occupations, especially at the writing-desk or drawing-table; a change of modes of life, as from active employments to inactivity; certain trades, as shoe-making and weaving; the spring and summer seasons; sudden or frequent vicissitudes of temperature and weather, especially rapid changes from cold to heat; suppression of accustomed excretions and discharges; and congestions or enlargements of the liver or spleen. M. Louis found hæmoptysis to occur among men nearly in the same proportion at all ages. Galen, Strampin, Goltz, and Louis, consider it to be more frequent in females than males. Frank and Conring entertain a different opinion; the latter remarks, that men are more prone to the disease than females, unless when the catamenia of the latter are suppressed. Louis found it more frequent in females in the proportion of three to two, and that their age was most commonly from 40 to 65. I believe that the predisposition to hæmoptysis is less, or at least not greater, in females than in males, until the period at which menstruation usually ceases; but that, after this period, the frequent occurrence of vascular plethora favours the production of pulmonary hæ-

morrhage. There is no doubt of the influence of premature and excessive venereal indulgences, and more especially of solitary vices of this kind, in favouring the occurrence of this and its allied diseases.

109. *B.* The *Exciting Causes* are chiefly external injury; fracture of the bones of the thorax; wounds of the chest and lungs; falls or concussions on the chest; physical efforts, particularly in lifting or carrying great weights; compression of the thorax by strait-lacing, &c.; running, especially against the wind, and hunting; protracted exercise with the arms, great exertions of the voice, reading aloud, or speaking for a long time; playing on wind instruments; inhaling irritating fumes, as those of acids, &c., or particles of dust, as in various occupations (see art. Arts and Employments, § 40.); foreign bodies fallen or drawn into the trachea and bronchi; cold in any form or mode of application; rarefaction, or great dryness of the atmosphere; the suppression of other sanguineous discharges; anger, and the more violent mental emotions; venereal excesses; terror, frightful dreams, or sudden surprise; severe fits of cough, of laughter, or of sneezing; straining at stool; and changes in the state of the blood. Besides these, many of the lesions just mentioned (§ 104. *et. seq.*) act as exciting causes, especially tubercles and their consequences; alterations of the vessels either in the seat of hæmorrhage, or near the centre of circulation; and difficult or impeded passage of blood through the heart, pulmonary vein, or aorta, &c.

110. *C.* The *seat of hæmorrhage,* in cases of hæmoptysis, has not always been recognised with precision. Previous to the writings of Bichat, the effusion was very generally supposed to proceed from a ruptured or ulcerated vessel, arterial or venous. Subsequently it has been generally referred to exudation from the capillaries of the bronchial membrane. I believe that at present it is too exclusively imputed to this source; and that, although this is much the most common mode of its production, it not infrequently proceeds from an ulcerated or diseased vessel, particularly when the discharge is sudden, very copious, or rapidly fatal. — It has been supposed by some, that the blood is exuded from the general surface of an ulcerated cavity, when this lesion has preceded the discharge. This may possibly be the case in a very few instances; but, when the cavity is the seat of hæmorrhage, one vessel, or a few only, are most likely its source. In most of the cases of hæmorrhage, in connection with cavities in the lungs, that I have seen, the internal surfaces of these cavities, or fistulous ulcers, appeared not in a state indicating that hæmorrhage either had, or could have, taken place from them. The circumstance of the small bronchi being filled with blood, or their membrane being deeply tinged, or even injected or inflamed, is no proof of the discharge having taken place from them, as the blood, when once effused, even as high up as the trachea, will frequently gravitate or pass downwards into the minute air-vessels, especially when the lungs are in a state of disease or of debility, and will discolour, irritate, or even inflame them.*

111. J. P. Frank has endeavoured to establish a variety of hæmoptysis under the denomination of tracheal, from its seat. Admitting the occasional occurrence of hæmorrhage from this situation, it rarely can be distinguished from other states of the disease, even with the aid of percussion and of auscultation; for, as this very able and practical writer has shown with great truth and originality, a considerable portion of the blood effused in this situation passes down into the bronchi, and gives rise to the same phenomena as depend upon the more common forms of the malady. This, however, he concedes. In cases, also, of profuse hæmorrhage from the pharynx or parts adjoining, a portion of the blood may escape into the trachea, descend into the bronchi, and afterwards be coughed up, thereby simulating hæmoptysis. The blood may thus pass into the lungs as well as into the stomach (§ 91. 99.), and may either be coughed up, or both coughed or vomited up, thereby simulating true hæmoptysis; or, if the quantity be great, it may suffocate the patient. Dr. Watson mentions a case which he saw, in which suffocation occurred from the passage of blood into the respiratory passages, from an ulcerated opening into one of the lingual arteries, the bronchi containing a considerable quantity of this fluid. From the foregoing, therefore, it may be inferred, that the blood in true hæmoptysis proceeds from one or other of the following sources: — 1st, From the mucous membrane of the bronchi — *Bronchial hæmorrhage.* — 2d, From the substance of the lung, constituting the pulmonary apoplexy of Laennec, or, more correctly, *Pulmonary Hæmorrhage.* — 3d, From an ulcerated or tuberculous cavity, one or more vessels having been eroded or ruptured. — 4th, From aneurism of the aorta, or of some other artery.

112. *D. Certain Pathological Relations of Hæmoptysis* have been very generally overlooked by writers on this and other pulmonary diseases. — *a.* The intimate connection, however, existing between it and *tubercles in the lungs* has been very diligently investigated by Louis, Andral, and others. Andral refers to cases of hæmoptysis in which there appeared to be no evidence of the previous existence of tubercles in the lungs. Such cases are rare, and are to be referred chiefly to extreme congestion of the lungs. Instances are certainly not infrequent, of the hæmorrhage occurring in a state of apparent health; but, in many of these, tubercles in an early stage of their existence may have previously been formed, or even have been detected upon close examination.

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* This, as well as other points connected with hæmoptysis, are very justly stated by the elder Frank: — "Si multus, et ex vasis conspicuis, majore cum impetu cruor in bronchium ruit; ex hoc, in alia, vicina, altiora, assurgit; ex istis, per ramos bronchiorum laterales, declives, in subjectam pulmonis affecti, aut etiam in sani, substantiam descendit, ac novo reflexu, sub summæ anxietatis ad præcordia sensu, violenta diaphragmatis actione, sed interdum *sine tussi* manifesta, et per solam quasi expirationem fortiorem, torrentis adinstar, per tracheam, laryngem, per oris, et narium per ostia, tam fluidus ac floridus, quam partim concretus, obscurus, horrendo spectaculo præcipitat. Sub tanto cruoris ad fauces impetu, pars ejus, in pharyngem regurgitans, *vomitum*, ut vidimus, violentum sæpe provocat, cibosque, forsitan ventriculo contentos, novæ sanguinis undæ, per tracheam simul expulsæ, commistos, expellit, ac validum medico, tussis ipsum aliquando per vomitum cruentum excitatæ, non ignaro, quo demum ex cavo sanguis scaturiat, dubitandi argumentum relinquit. Hæc dubia non minus in casu, quo tussis violenta præivit, ac, istius ob impetum, sanguis non modo pulmonum, sed simul narium e vasis expellitur, urgebunt; aut facile pulmo, ob nares cruentas, profluvii insons, cum magno judicii errore, declarabitur." *De Curand. Hom. Morb. &c.* class v. ord. iii. gen. 3. § 606.

Baillou remarked that profuse hæmorrhage from the lungs is less dangerous than small, and there is much truth in the observation; but Portal went too far in saying, that those who habitually spit blood are rarely phthisical. My own observation is more in accordance with that of Louis, who states that, with the exception of some cases in which hæmoptysis depends upon external injury, or is connected with suddenly suppressed catamenia, it indicates with very great probability the presence of tubercles in the lungs. Dr. James Clark, in his able work, observes that hæmoptysis is occasionally idiopathic, or dependent upon a temporary plethora or congestion of the lungs, especially when it is a consequence of suppressed sanguineous discharges. In tubercular phthisis, congestion of portions of the lungs, or even of the whole of the organ, is not infrequent, and is, in many cases, followed by a more or less copious hæmoptysis. Such congestion may also develope tubercles, or hasten their progress, as well as occasion the effusion of blood. In some instances the discharge will afford relief to all the pulmonary symptoms, especially when the effused blood is entirely thrown off; but, in others, it will accelerate a fatal issue, particularly when a portion of it remains in the bronchi, and irritates them, as shown hereafter (§ 114.).

113. It has been supposed by Andral and others, that hæmoptysis occasionally is a cause of phthisis, the blood effused into the lungs forming a matrix for tubercular deposits. But to produce this effect the effusion must take place in a scrofulous constitution. I agree, however, with Dr. James Clark in considering hæmoptysis rarely to be a cause of phthisis, unless by the debility it induces when very copious, or by the depletion employed to suppress it; or still more probably by the irritation produced by the effused blood in the minute bronchi. It is a frequent symptom during the whole course of phthisis, and may appear at any stage. Louis states that it was present in some degree or other in two-thirds of his cases. It is rare in the phthisis of children and old persons, and occurs generally towards the close of the disease.

114. *b.* The connection between hæmoptysis and *inflammation of the lungs*, has been very generally overlooked. The former occurs in very rare cases as a termination or crisis of the latter; but when the inflammation is associated with tubercles, the development of these is frequently promoted by the hæmoptysis. One of the most common consequences of hæmorrhage into the bronchi is inflammatory action. The effused blood irritates the mucous membrane of the bronchi, especially in the minuter ramifications, and the morbid action often extends to the air-cells and substance of the lungs. This is very frequently observed in weak and susceptible constitutions, and when the effused blood has been imperfectly excreted from the bronchi. The softening and discolouration of the bronchial surface, generally seen in fatal cases of hæmoptysis, arise from this consecutive inflammatory irritation; and the puriform matter sometimes poured into the bronchi, with or without fibrinous concretions, or a coloured lymph, proceeds from the same source. A part, doubtless, of the fibrinous matters arises from the effused fluid; but a part also consists of the lymph given out by the capillaries, which had shortly before discharged blood. — In all cases, therefore, of hæmoptysis, it is not merely the development of accelerated progress of tubercles which is to be dreaded, but also the supervention of circumscribed or diffused *pneumonia*, which may assume any of the forms described in *Inflammation of the* Lungs.

115. *c.* The relation of hæmoptysis with *disease of the heart* has been already alluded to. The momentum caused by hypertrophy of the right ventricle is rarely sufficient to rupture any branch of the pulmonary artery, although it may probably overcome the resistance opposed by the tonicity of the extreme capillaries in the bronchial surface, or in the substance of the lungs. Dr. Watson, who has taken a very sound view of this, as well as of some other subjects connected with hæmoptysis, states that every instance of pulmonary hæmorrhage dependent upon organic disease of the heart which he had observed, coincided with disease on the left side of that organ, mechanically obstructing the return of blood from the lungs. The obstacle has sometimes been placed at the entrance of the aorta, but it has most commonly consisted of narrowing of the left auriculo-ventricular orifice, and a rigid condition of the mitral valve. Facts illustrative of this relation have also been adduced by Dr. Wilson (*Med. Gazette*, vol. vi. p. 25.), and observed by myself. I believe, moreover, that those powerful mental emotions, which affect suddenly the functions of the heart — which seriously disturb its action and favour congestion of its cavities, as terror, fear, anger, grief, &c. sometimes produce hæmoptysis by impeding the return of blood to the right side of this organ.

116. *B. Other complications* beside the above occasionally present themselves in practice; but, in these, hæmoptysis is merely a symptom, arising from some predisposition to pulmonary or hæmorrhagic affections. — *a.* It has been stated that bronchitis and pneumonia often follow hæmoptysis, and the reason has been assigned (§ 114.). But the *complication* of acute or sub-acute *pneumonia* with slighter forms of this disease, has been very generally overlooked, especially by recent writers. Stoll and Broussais, however, have remarked that hæmoptysis sometimes accompanies, or is an accidental symptom of, pneumonia. The remark is just. Care, therefore, should be taken to recognise this state, as well as to distinguish between both diseases; as the use of astringents, on the supposition that the patient is suffering the former affection only, might lead to fatal results. Even with the aid of auscultation, the existence of the pneumonia may not be ascertained, as the auscultatory signs may be ascribed to the infiltration of the bronchi, or of the substance of the lungs, with the effused blood, or to the attendant congestion. The rational symptoms in this case should be carefully weighed; and where there are dyspnœa, cough, oppressed or quick breathing, heat of skin, a hard or full pulse, deep-seated pain in the chest, crepitant rhonchus and bronchial respiration, present, the disease should be viewed as inflammatory, the hæmorrhage being merely a contingent symptom or complication. Even when the hæmoptysis has originated in tubercles, inflammation of one or more lobes of the lungs may also exist, and may implicate not only the substance of the organ,

but also its pleura, giving rise to albuminous exudation, and adhesions to the costal pleura. I have not infrequently found, upon dissection of cases of hæmoptysis, not only tubercles in every stage of their progress and results, but also inflammations of the substance of the lungs, and of the pleura*, with all the structural consequences, and yet, in some cases, no pain had been felt so severe as would have directed attention to an affection of the pleura.

117. *b.* It is not unusual to see hæmoptysis in the course of severe *hooping cough*, especially when this latter disease affects persons near, or after, the period of puberty. In children the hæmoptysis is generally slight; but in grown-up persons it is often a dangerous or fatal complication of hooping cough. — *b.* It is occasionally observed as a consequence of *enlargement* or *congestions* of the *liver* and *spleen*; these affections in some measure causing the pulmonary hæmorrhage, by deranging the circulation through the lungs, or heart, or both. In most of such cases the functions of the heart are intermediately disturbed. Where the hæmoptysis is consequent upon hæmorrhoids, obstructions of the liver may be anticipated. This connection has been noticed by BAILLOU, MORGAGNI, STOLL, LANDRÉ BEAUVAIS, and others. SAUVAGES makes very particular mention of the occasional dependence of hæmoptysis upon enlargements of the spleen. The connection between hæmoptysis and *hæmorrhoidal affections* is generally one of sequence rather than of association; the former following the latter, or sometimes occurring after operations for these, and for *fistula in ano*. The connection with *amenorrhœa* is generally that of cause and effect; but the pulmonary disease and the attendant hæmorrhage more frequently give rise to the suppression of the catamenia than this latter occasions the hæmoptysis. — *c.* Pulmonary hæmorrhage has also, in rare cases, appeared in gouty persons, or in connection with irregular or misplaced *gout*. In these, calcareous concretions have sometimes been expectorated with the blood, or have been found in the lungs on dissection. — *d.* The symptomatic occurrence of hæmoptysis in the course of *measles*, of *putro-adynamic fevers*, of *scurvy*, *purpura*, and pestilential diseases, requires no remark.

118. iii. DIAGNOSIS. — It will often be difficult to determine whether or not the blood discharged proceeds from the bronchi, or from the nares, throat, pharynx, or stomach, owing to the circumstances insisted upon in other parts of this article (§ 91. 99.). The remarks there made, in illustration of this, render it unnecessary to enter much further into the subject. — *a.* When the blood is florid, frothy, or contains bubbles of air, or is mixed with muco-puriform matters, then all doubt will be removed. The history of the case, and the premonitory and attendant phenomena, are generally such as to remove all difficulty, unless when the patient has been previously in good health, or when the blood is of a dark hue, or when a large portion of it has been swallowed, and is thrown up by vomiting. In these cases, it will very commonly be found upon auscultation that blood is present, either in the large bronchi, causing a bubbling rattle, or in the small ramifications, with loss of the respiratory sounds, and with dulness on percussion. Phthisical indications, also, referrible to the constitution, have generally preceded the attack; and symptoms of disorder of the respiratory organs have ushered it in, and accompanied it.

119. *b.* When the accumulation of blood in the *pharynx* from the fauces or adjoining parts excites cough, or escapes into the trachea or bronchi, the difficulty of determining with precision the source of the discharge is generally great. In these the practitioner will be guided chiefly by the state of the patient just before the attack, and by the premonitory symptoms. The absence of disease within the chest, as indicated by auscultation and percussion, an attentive examination of the mouth and throat, and a close observation of the phenomena attending the discharge of blood, will greatly assist the diagnosis (§ 91.99.).*

120. iv. PROGNOSIS. — Hæmoptysis is always a serious disease, and attended by danger in most circumstances. This character, however, does not so much depend upon the hæmorrhage, as upon the pathological state or lesion, of which it is the consequence. The opinion as to the result will, therefore, be chiefly formed from the inference as to its source. Wherever there is any obvious sign of tubercular disease, and when dyspnœa or pulmonary symptoms have preceded the attack, a most unfavourable prognosis should be given. The question merely relates to the period which may elapse from the occurrence of hæmorrhage to a fatal termination; and this will depend much upon the season, upon the progress of the pulmonary lesions, and various other circumstances. — The cause of the disease should also be taken into consideration, and the pathological states which complicate the hæmorrhage. When there is reason to infer that venereal excesses, and more especially solitary venereal vices, have induced the malady, as they very frequently do, we may infer that tubercles have preceded the attack; and should consequently form a most unfavourable prognosis, especially when the diathesis is obviously scrofulous or hæmorrhagic. The circum-

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* As the article was going through the press, a boy, aged 15, of a scrofulous diathesis, who had been long under my care with tubercular phthisis, died with profuse hæmorrhage from the lungs. Excavations in this organ, with accretion of the pleura, had been recognised some months before his death. He had not complained of pain in any part of the thorax. The body was examined in my presence by Mr. HERBERT BARKER, twelve hours after death. Numerous cavities with thick linings were found dispersed through both lungs; the small intervening spaces being studded by crude tubercles. Each lung contained between thirty and forty ulcerated cavities, varying from the size of a bean to that of a large orange; those on the right side being the largest, and from this side the hæmorrhage had taken place. The cavities on the left side were filled by pus of various colour and consistence. Those on the right were filled chiefly by coagulated and fluid blood, the latter mixed with pus in some places. The right pulmonary pleura was so firmly adherent to the costal and diaphragmatic pleuræ, that this lung could not be removed from the chest until all the costal pleura was removed from the parietes to which it was attached. In this case the heart participated, in its unusual atrophy, in the extreme emaciation of the body. The stomach, as in many cases of profuse or fatal hæmorrhage from the lungs, contained a large quantity of blood, thus illustrating the statements made above.

* PAULUS ÆGINETA remarks, that if the blood be frothy and light, it comes from the trachea; but if it be black or grumous, and if there is pain in the part, it is from the thorax. If it is brought up by hawking, it is from the palate or parts about the pharynx. If it flow from the head, it is evacuated with tickling and cough, for it runs down into the windpipe, and is again brought up; such discharges being generally preceded by an acrid defluxion, and by headach or heaviness. (l. iii. ch. 31.)

stance of the patient not being alarmed by the attack, but flattering himself with the hopes of recovery, should be taken into account, as recommended as early as Aretæus. The dependence of the effusion upon disease of the heart, especially upon narrowing of the left auriculo-ventricular opening, is, perhaps, not a much more favourable circumstance than the connection with tubercles.

121. A more favourable, but still a guarded, opinion may be given, when the attack seems dependent upon inflammatory determination to the lungs, or on active congestion, or upon general plethora, when the indications of pulmonary disease, or of constitutional fault, are not present; and when the attack has been produced by external violence, or by mechanical injury. If it have arisen from suppressed catamenia or hæmorrhoids, or in connection with congestion or enlargement of the liver or spleen, a similar opinion may be formed, unless the indications of pulmonary disease are manifest; but when the disappearance of these or of other evacuations are evidently the consequence of the disease in the lungs, and of which the hæmoptysis is merely a part, the prognosis should be as unfavourable as in the circumstance above noticed. When hæmoptysis appears after the operation for fistula, particularly when the fistula has been connected with pulmonary symptoms, as it often is, the result may be surely predicted.

122. In every case of hæmoptysis, the opinion should partly depend upon the symptoms immediately preceding the seizure, and upon the frequency and state of the pulse both during and after the discharge; due allowance being made for the alarm caused by the occurrence. If the pulse becomes quick and sharp, the breathing short or oppressed; if symptoms or signs of inflammatory action in the lungs or pleura exist or supervene; if a large portion of the lung cease to be traversed by the air; if the expectoration be puriform, or rusty, or offensive; and especially if a cavity be detected in the lungs, and particles of softened tubercular matter appear in the expectoration, a fatal result should be expected.

123. v. Treatment.—*A.* Aretæus and Paulus Ægineta recommend that the patient be laid upon a couch in a cool place, with the head elevated; and all physical and mental excitement, and talking, or strong respiration, should always be carefully avoided. As to the means of cure, Celsus, Galen, Aëtius, and Alexander are tolerably agreed. Aretæus, Oribasius, Actuarius, and Nonnus, advise bloodletting in most cases, ligatures on the extremities, and astringents internally and externally. A similar practice is advocated by Celsus, with the addition of cold drinks. Scribonius Largus and Octavius Horatianus direct the chest to be sponged with vinegar. Galen remarks, that cooling astringents often have a different effect from that which they are intended to produce; that they occasion determination of blood internally, and congestion of the deep-seated veins; and that he has seen persons with hæmoptysis injured by the application of cold to the chest. He, therefore, does not approve of the indiscriminate recourse to astringents and to cold. Cœlius Aurelianus recommends the application of cold water and vinegar, or other astringents, to the thorax, and bleeding, general or local, or both, if pain, dyspnœa, or a dry cough be present. He gives, internally, gum with alum, and decoction of poppies, vinegar, and electuaries with opium, frankincense, &c. He decides in favour of the disputed practice of applying ligatures to the extremities. Similar remedies are advised by Paulus, with the addition of austere wine and fruits. Amongst the latter, the pomegranate is particularly mentioned. Marcellus directs nearly the same means, with the exception of ligatures. Dioscorides, Pliny, Galen, Alexander, Paulus, and most of the ancients prescribe the hæmatite, or blood stone, which contains oxide of iron.

124. The Arabian writers supply very little information respecting the treatment of hæmoptysis, beyond what is contained in the works of the Greeks. Avicenna, who is very full upon the subject, approves of the internal exhibition of vinegar, and of anodynes, as mandragora, henbane, and poppy, for the relief of cough. Averrhoes condemns the use of vinegar; but Rhases and Serapion advise the chest to be sponged with it. Mesue prescribes chalybeate waters for drink, and astringents. Haly-Abbas endeavours to adapt the treatment to the forms of the disease. In the hot (the active) variety, he directs bleeding from a vein, and the repetition of it, if required, purging with mild medicines, and the combination of demulcents with poppy. When the disease arises from a cold cause (passive), he prohibits venesection and prescribes stimulants — as frankincense and myrrh, and, in some cases, tonic astringents — as galls, sumach, alum, &c., with astringents applied to the chest. Alsaharavius approves of bleeding, cold applications to the thorax, opiates and astringents, with a milk diet. Rhases agrees with this practice, but guards against the indiscriminate application of cold to the breast. Mr. Adams, in his interesting remarks (*Trans. of* Paulus Ægineta, p. 412.), states that cold applications to this part are not now generally resorted to; yet a practitioner lately acquired great celebrity for curing hæmoptysis by sponging the chest with vinegar. I have been called to two or three cases, for which cold epithems had been most assiduously employed; but they were injurious, and evidently increased the pulmonary congestion and all the pectoral symptoms. Van Swieten is favourable to the internal and external use of cold water in this disease; but I am confident that sponging with vinegar will be found more serviceable and more generally appropriate than a prolonged application of cold.

125. *B.* From the brief view now exhibited, it will be seen that but little progress has been made in modern times in the treatment of hæmoptysis; and that this progress has reference chiefly to the more appropriate use of the means, which were known to the ancients as well as to the moderns. Much, however, will depend upon the decision with which they are prescribed and carried into effect. Upon seeing a patient attacked by hæmoptysis, the physician will frequently find him alarmed; and the consequences of such alarm may be mistaken for the state of the constitution, or the effects produced by the disease. This and various other circumstances must be taken into consideration, and a determination as to the measures to be adopted, in order to arrest the hæmorrhage, promptly formed.

126. *a.* The clothes should be removed or loosened

from the upper part of the body, and the patient ought to be seated upright in a chair, in order to facilitate the discharge of the blood from the lungs. In a recumbent, or even reclining posture, the blood will more readily pass along the bronchi, and fill the smaller ramifications, than when the chest is erect, and its movements during respiration unimpeded. If the patient be robust or young, if he have not suffered long from pulmonary disease, and if the hæmorrhage has not been very great, *bloodletting* ought to be immediately performed in the arm from a large orifice, until an impression is made upon the pulse, or faintness ensue. Whilst the blood is flowing, the bared chest may be sprinkled with cold water, or sponged with vinegar; and any astringent the earliest procured, as vinegar slightly diluted, may be taken internally.— The quantity of blood to be abstracted, and the repetition of the operation, must entirely depend upon the effects produced by it, and the judgment of the practitioner; but he will be guided in this by the constitution and state of the patient, by the indications of active congestion, or inflammatory determination, by the continuance and violence of the hæmorrhage, by the antecedent symptoms, and by the information he may obtain as to the causes and pathological relations of the seizure. If the patient be delicate, or enfeebled by previous disease, or if the hæmorrhage has continued so long as to render venesection a hazardous measure, or if bloodletting has been already resorted to, or repeated, *cupping* should be substituted. Where further abstraction of blood, even by cupping, cannot be ventured on, *dry-cupping*, as advised by HIPPOCRATES and most of the ancients, and in modern times by HORNE and WEIDEMANN, ought to be adopted. When the least delay may increase the danger, it may be very efficiently and promptly performed with some common beer glasses, or other similar means, several being applied, either between the shoulders or upon the breast. I have often used dry-cupping, in addition to venesection, with marked advantage; sometimes covering the back and shoulders by the substitutes just mentioned. If the hæmorrhage be connected with suppression of the catamenia or hæmorrhoids, the feet should be plunged in warm water, and a vein opened in each foot. If the hæmoptysis is moderate, a number of leeches may be applied to the tops of the thighs, or around the anus. The derivation produced by these means, and the effects of the latter in restoring the suppressed discharge, should not be neglected. CELSUS advises cupping to be performed in these situations, especially when the disease is thus associated.

127. *b*. It often happens, when hæmoptysis ceases, after a small or a single bloodletting, or when the pulse rises in strength and frequency, that the hæmorrhage returns in one, two, or three days, or after a longer interval. This mostly occurs in young or plethoric persons, where the discharge is connected with congestion of the lungs, or when the first attack has been slight, and the venesection sufficient merely to give a greater freedom of vascular action, without removing the pulmonary congestion or determination. In these cases, bloodletting should be repeated, in order to prevent a renewed attack, especially if the pulse rise after the first depletion, and if signs of inflammatory action in the lungs or bronchi appear. The patient should be carefully watched after the first discharge, and daily examined by the stethoscope and by percussion; and, upon the first indication of returning hæmorrhage, or of supervening inflammation, blood ought to be taken away in one or other of the modes just stated, according to the peculiarities of the case.

128. Where the antecedent disease, the quantity of blood discharged or removed by venesection, and the manifest asthenia from these or other causes, forbid further depletion, recourse must be had to *derivatives, astringents*, and *sedatives*, generally simultaneously or in combination. Indeed, even in those cases which evince increased action, and require decided or repeated depletion, these, as well as refrigerants, ought to be brought as early as possible into simultaneous or successive action. The feet and hands ought to be plunged in warm water; and, if venesection be not performed in the former situation, mustard or salt, or both, should be added to the water. An enema with an ounce, or an ounce and a half, of spirits of turpentine, should be administered forthwith; and other means appropriate to the case prescribed. But as to these means, much difference of opinion will necessarily exist. The internal use of astringents is generally adopted; but those usually employed can have little effect, excepting in slight or protracted cases; and even powerful astringents taken into the stomach will have little or no influence upon the bleeding part before a number of hours have elapsed. From observing the rapidity with which oil of turpentine is absorbed, and passes off by the kidneys and lungs, I have been induced to employ this medicine in preference to others as an astringent in hæmoptysis; prescribing it in small or large doses, according to circumstances, and as it seemed desirable to act at the same time more or less decidedly upon the bowels or kidneys.

129. In advising sponging with vinegar and rose-water, or sprinkling cold water on the breast, I had especial reference to the sympathetic influence these may have upon the bleeding surface, and the reaction in the skin which they subsequently occasion, especially when they are also applied to the face. When these means have not succeeded, I have, on several occasions, prescribed rubefacients, instead of cold applications, to the chest; as these last are more frequently injurious than beneficial in such cases. An epithem, with oil of turpentine, either tepid or warm, allowed to remain on the breast, or between the shoulders, until it occasions a burning sensation and redness, is the rubefacient I have preferred, as the quickest in its operation, and the most conducive to the removal of congestion or of inflammatory action. The vapour also of the turpentine is diffused around the patient, and being inhaled during inspiration, assists in constringing the vessels of the bleeding surface. Where there appears any objection to this application, a *sinapism*, or a piece of flannel soaked with either of the *liniments* (F. 296. 311.), may be placed upon the chest.— *Blisters* may also be resorted to. I agree with LENTIN, RANOË, and PERCIVAL, in the propriety of applying them to the back or between the shoulders.

130. *c*. Besides the above means, others may be employed; the practitioner being guided in his selection by the peculiarities of the case, and es-

a. A Blister applied over the Chest in Scott's case (Phthisis with Cavernous Respiration – appeared to bring on a renewal of Hemoptoe after it had ceased for three or four days: ought I not to have anticipated such an effect, when Dr. M. Hall was curing Phthisis by a cold spirit-Lotion, frequently applied

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pecially by the previous treatment, by the state of vital power and vascular action, and by the presence of cough and febrile symptoms. It should be kept in mind, that the sooner the hæmorrhage is arrested, the least likely is infiltration of the bronchi and its consequent evils to take place; and that, whilst this — *the first indication of treatment* — is receiving attention, the accumulation of the effused blood, and the consecutive effects upon the bronchi and lungs, and through them upon the system, ought to be prevented as far as possible.—The treatment already described, with reference to hæmorrhage in general, is, in great measure, appropriate to hæmoptysis, according to the principles of its application already advocated. Most of the information that will be here conveyed may be viewed chiefly as suggestions, which the practitioner will receive or reject, as he may deem proper, or which he may apply to practice as the features of the disease may warrant. He ought, however, to be impressed by the fact that, however high vascular excitement may appear, vital tone is more or less impaired; that in proportion as tone becomes diminished, so will the tendency to infiltration of the bronchi or lungs with the effused blood, and to capillary congestion of them, be increased; and, consequently, that vascular depletions and other vital depriments, although often requiring promptitude and decision, should be employed with discrimination and caution.

131. *d.* Of the various *astringents* recommended in hæmoptysis, the *acetate of lead*, conjoined with opiates or other sedatives, as advised by REYNOLDS, LATHAM, DAVIES, VALENTIN, AMELUNG, and others, is one of the most deserving of adoption. It may be given more freely than has generally been done, as shown by Dr. A. T. THOMSON, if it be conjoined with acetic acid, this acid being itself one of the best remedies when taken in sufficiently large quantity. Of this the ancients were fully aware, as it was employed most liberally by them. The *mineral acids* appear to be preferred by HENNING, DOEMLING, HALLER, JOERDENS, LOEFLER, SCHULZE, and others; and by most of the moderns. I have, however, seen the liberal use of common vinegar more efficacious than these; and it is more generally congruous with the other remedies usually employed. Indeed, where the acetate of lead is given, the mineral acids will either neutralise its effects or prove injurious. The *gallic acid*, dissolved in water, or in ether, or in alcohol; and the powder or tincture of galls may be mentioned. RUSPINI's styptic is supposed to be a solution of this acid in ether or in spirit; and may also be tried, on account of its reputed efficacy.* Of other astringents, little additional mention need be made. They are sometimes useful in the more adynamic states of the disease, or after large losses of blood, or copious depletions. When debility is urgent, those which are most tonic may be selected, as the tincture of the muriate of iron; the sulphates of iron, or of alumina, or of zinc, or of quinine — the two latter in the infusion of roses with sulphuric acid; and the vegetable astringents, as catechu, kino, uva-ursi, extract of logwood, rhatany, pomegranate bark, &c. The mineral acids, as well as the other astringents, may be conjoined with opium or other anodynes. — A strong solution of alum, and alum whey, for common drink, have been very generally employed by both ancients and moderns.

132. *e. Refrigerants* are required in the more febrile and active states of the disease, as adjuvants, chiefly of depletions, and other antiphlogistic remedies. They are further beneficial by acting upon the kidneys. *Nitre*, in considerable or frequently repeated doses, is recommended by GIBBON, DICKSON, HARTMANN, HUFELAND, and many others. It is much used by the Italian physicians, in large doses, conjoined with demulcents. They give from three to six drachms in twenty hours. It is also beneficially associated with camphor, the acetate of ammonia, and sweet spirits of nitre (F. 95. 294. 747.), or with the *boracic acid* (F. 644.), and with conserve of roses. The *muriate of ammonia* is equally serviceable, especially in the more passive states of hæmoptysis, when it is advantageously conjoined with muriatic acid (F. 864.). LENTIN advises it to be taken in half a drachm every two hours, with an equal part of extract of liquorice. The internal use of ices, or of iced fluids, has been advocated by many writers. But, like all other active means, they require discrimination. In the passive states of the disease — where asthenia is apparent, the circulation languid, and the temperature not much above the natural standard, — they are injurious.

133. *f.* Alvine evacuations are serviceable, by removing morbid matters and obstructions to the portal circulation, and by deriving from the seat of hæmorrhage. — *Purgatives* ought, therefore, never to be neglected; and, unless when the hæmoptysis is so abundant as to be alarming, they should precede, or be alternated with, astringents; or such of these latter as will not confine the bowels ought to be selected. The exhibition of an *emetic*, previous to the purgative, has been advised, especially by STOLL, DARWIN, PLENCIZ, RANOË, DOEMLING, PAULINI, and SCHMIDTMANN; whilst FRANK and some others think them hazardous. When the hæmorrhage has been already copious, or after bloodletting has been resorted to, an emetic of ipecacuanha, or of sulphate of zinc, or of a combination of both, is serviceable, not only in aiding the arrest of the effusion, but also in evacuating the blood accumulated in the bronchi, and thereby preventing the ill effects which this fluid would produce if it were allowed to remain. It is not merely the vomiting caused by an emetic which is beneficial, but the effect which is produced upon the heart's action. It is with reference chiefly to this latter operation — to its contra-stimulant action — that emetics and *nauseants* have been recently employed on the Continent, especially in Italy, and by LAENNEC and others in France. In the passive or asthenic forms of the disease, nauseants, especially the tartar emetic, may be injurious — even in the same case, wherein an emetic of sulphate of zinc might prove of service. As to *purgatives*, the neutral salts, with an excess of acids, as the sulphates with sulphuric acid in infusion of roses, or the supertartrate of potash, in the form of electuary, are the most generally appropriate — with the exception, perhaps, of oil of

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* Dr. A. T. THOMSON states that this styptic consists of gallic acid, a small proportion of the sulphate of zinc, and of opium, dissolved in a mixture of alcohol and rose-water. This combination is judicious in most hæmorrhages.

turpentine, conjoined with castor oil.—These oils may be taken on the surface of an aromatic water or of milk, and be administered in enemata.

134. *g.* In exhibiting *anodynes*, the probability of their being injurious in the asthenic states of hæmoptysis should be recollected. When the powers of the system are inadequate to procure the excretion of the fluid effused into the bronchi, they ought to be given with caution, or in conjunction with tonic astringents, or with expectorants. *Colchicum* has been recently recommended, but it is only in the active states of the disease that it ought to be exhibited (F. 545.). *Digitalis*, however, is more generally prescribed. It is recommended by Withering, Jones, Ferriar, Heusinger, Valentin, Carson, Henry, Horn, and others. It may be conjoined with astringents (F. 544.), narcotics, or other appropriate remedies (F. 514, 515.). —*Narcotics* are most serviceable when cough is urgent — by allaying the irritation, and diminishing the risk of the perpetuation or recurrence of the effusion from this cause. But when the hæmorrhage has ceased, and when breathing is difficult, the lungs congested, or the bronchi obstructed, by the effused blood, narcotics, especially in large doses, will only retard the discharge of the effused blood, and increase the mischief, unless they be conjoined with expectorants, as the senega, or benzoin, benzoic acid, myrrh, assafœtida, the balsams of Peru or of Tolu, the terebinthinates, or camphor. In the passive states of the disease, or after large losses of blood, the balsams, both natural and artificial, especially those prescribed in the *Appendix* (F. 18—22.), are often beneficial. The balsam of Locatelli is very much employed in the Continent in hæmoptysis, and, from its composition, it seems very appropriate to most circumstances of the disease. The turpentine is the active ingredient, not only of it, but of the other artificial balsams prescribed in hæmorrhagic affections. The following is the usual mode of preparing it:—

No. 241. ℞ Olei Olivæ ℥ viij.; Terebinthinæ, Ceræ flavæ, āā ℥ iv.; Pulv. subtiliss. Ligni Santali rubri ℥ ss. Ceram in Olei pauxillo solve, dein reliquum, Terebinthinam, Lignumque Santali adde, et assiduè move donec refrixerunt.

135. *h.* There have been various other means recommended for the arrest of hæmoptysis, but many of them are not deserving of notice, and are therefore not here adverted to. The application of *ligatures* on the extremities was a disputed practice with the ancients, although most of them recommended them. J. P. Frank and J. Frank approve of them, and direct them to be placed high above the knees and elbows in such cases as admit not of bloodletting, owing either to the profuse hæmorrhage, or to constitutional adynamia. *Ipecacuanha* in small doses frequently repeated is praised by Loefler, Hennings, Aaskow, Keck, and Niemann; and by De Meza and Horn, conjoined with opium; the *secale cornutum*, by Spazani, Negri, and Ryan; a strong solution of *common salt*, by Percival, Doemling, Michaelis, and Rush; the turpentines, by Young, Boyle, and Adair; and the *comfrey*, with aromatic sulphuric acid, by Wendt. With Marryat and numerous practitioners, mixtures containing nitre or alum, gums, and some one of the balsams, constituted the principal anti-hæmorrhagic remedies; and vascular depletions were prescribed. It cannot be doubted that bloodletting is often unnecessarily directed in hæmoptysis, or carried too far; but in the active or inflammatory states of the disease, and when the discharge is scanty or small, it should not be neglected.

136. *i.* A few authors have questioned the propriety of arresting the effusion in certain circumstances. Dr. A. T. Thomson remarks, that when the hæmoptysis "is not of an alarming character, and there is no obvious predisposition to tubercular consumption, especially if it be the consequence of a suppression of the menstrual discharge, it should only be moderated, not checked suddenly, which might induce a congestion in some organ less capable of supporting it with impunity." This is most dangerous doctrine; for, if the hæmorrhage be judiciously treated, the sooner it ceases in consequence the better. Hæmoptysis, in the circumstances stated by this writer, ought to be treated by depletions, derivatives, and other measures calculated to restore any suppressed discharge. The cases are very few in which there is no "obvious predisposition to tubercular consumption," and they are still fewer in which the suppressed discharge is the cause of the pulmonary disease; this latter, in either its more concealed or obvious states, almost always preceding, and even being the chief cause of, the suppression. It should be kept in view, that however moderate the hæmorrhage may appear to be, it is difficult to determine how far it may be attended by infiltration of the bronchi; and that the continuance of it, by filling these vessels, will risk the supervention of inflammatory irritation or action in them, and often also in the substance of the lungs and pleura; as well as hasten the development and progress of the tubercular productions.

137. *k.* The practitioner is not to rest satisfied with having fulfilled the first intention — *the arrest of the hæmoptysis* — his attention should immediately afterwards be directed to the *removal of any blood that may have collected in the bronchi, and of whatever inflammatory irritation connected with it either coetaneously or consecutively, that may exist.* Where a crepitation is present, and is much diffused through the lung of one or both sides, more generally of one, fluid is present, and it is either a mucous lymph, or blood, or both, with more or less serum; the state of the expectoration indicating the proportions of either. But the blood may not be expectorated, or may undergo changes previous to expectoration, and clog up the bronchi and air-cells, and either perpetuate inflammatory action, or excite it anew. In the slight forms of hæmoptysis attendant upon tubercles, the effusion of blood is frequently one of the consequences of the inflammatory irritation existing in various parts of the bronchi, connected with impaired tone and congestion of parts of the substance of the lungs. Now, by what means is the above consecutive condition to be removed? When the attack has been treated actively, the more antiphlogistic means having been employed, and the lungs still remain embarrassed, manifestly from a portion of the effused blood, or from the fluid subsequently exuded, the exhibition of an *emetic*, and the repetition of it, as circumstances may indicate, will prove most serviceable. If febrile action, heat of skin, &c. be still present, then tartar emetic, ipecacuanha, or both, may

be thus employed; but when the vital powers are sunk, and asthenia is very prominent, the sulphate of zinc should be preferred. In cases characterised by relaxed, thin, or weak fibres, and general flabbiness of the soft solids — where bleeding would be injurious, *emetics* are frequently most beneficial. — They have been often advised in hæmoptysis; but the indiscriminate or inappropriate use of them, and the somewhat empirical recommendation of them by Dr. Marryat, have led to their disuse. I have, however, often prescribed them with great benefit. This writer directs two grains of tartarised antimony to be first given, and, as soon as nausea commences, two grains of sulphate of copper, dissolved in a little water. He deprecates blood-letting, and, after the sickness has gone off, gives twenty drops of the balsam of copaiba, night and morning, for several weeks, to prevent a return of the attack, and the size of a nutmeg of the following electuary, twice or thrice a day: —

No. 242. ℞ Pulv. Cinchonæ ʒ vj.; Sulphuris Sublimati ʒ iij.; Potassæ Nitratis ʒ j.; Sulphureti Antimonii Præcipitati ℈ j.; Mucilaginis Acaciæ, q. s. ut fiat Electuarium.

138. I have no doubt of this treatment being quite appropriate to many circumstances of the disease; and, even in those cases where inflammatory action may supervene after the hæmorrhage has ceased, it may prove beneficial, especially if local depletion by cupping; external derivation by blisters, sinapisms, terebinthinated epithems or liniments, or by issues or setons; and suitable regimen, be employed. In order to fulfil the intention stated above, as well as to *prevent the return of the hæmorrhage,* the assiduous adoption of these external irritants, the internal use of the balsams or terebinthinates (F. 18—22.), and an emetic occasionally, to unload the bronchi of accumulated fluids or mucosities, will prove most serviceable. At the same time, the digestive and excreting functions ought to receive due attention; and cough or irritation should be allayed by the combination of narcotics and sedatives, as conium, hyoscyamus, opium, &c.; and of emollients or demulcents, with the above, or other suitable medicines. When the hæmoptysis assumes a periodic form, which rarely is observed, the combination of the sulphate of quinine with alum or with sulphate of zinc (F. 597. 667.), or the electuary just prescribed, according to Marryat, will generally prove successful.

139. *l.* The *inhalation* of watery or medicated vapours has been recommended in hæmoptysis, and lately employed by both rational and empirical practitioners. I have tried several substances, and in various combinations, through this medium. The practice requires much caution; but I think it will be found often of service if discrimination as well as perseverance be observed in respect to it. Towards the decline, or in the slighter forms of hæmoptysis, the more astringent substances may be used in this way, care being taken, that they neither occasion irritation or tightness in the thorax, nor excite cough. Those which I have tried in this state are — common vinegar, sometimes with a little camphor, or with a small quantity of turpentine; the pyroligneous acetic acid, kréosote, and common tar. These were put in an inhaler with hot water, and the vapour inspired in the usual way; or in a large basin, and hot water poured upon them, and the vapour allowed to diffuse itself around the patient. When a terebinthinated epithem, or liniment (F. 300. 311.) is used, the vapour from it will generally be sufficient. Some time after the hæmorrhage has ceased, the cautious adoption of this practice will be serviceable; and either these or other substances — as benzoin, assafœtida galbanum, myrrh, and other odoriferous resins, oil of aniseseed — may be employed in this way, as directed in the article Bronchi (§ 100.). In the more *asthenic forms* of the disease, when the expectoration is copious, or is tinged with very dark blood, the diffusion of the vapour of the above substances in the air of the patient's apartment, and the taking of frequent deep inspirations, will frequently prove beneficial. If the patient evince indications of coexistent or consecutive *inflammatory action, emollient vapours* (see art. Bronchi, § 76.), with the addition of the extract of conium or of hyoscyamus, or of stramonium, to the warm fluids employed for inhalation, will be extremely useful, especially if cough be severe.

140. *C.* The *regimen* during and after hæmoptysis is a most important part of the treatment. *a.* The ancients advised cooling beverages and diet. They allowed acid wine, and acerb or acid fruits. The *pomegranate* was much and deservedly praised by them, on account of its cooling and astringent operation. Glutinous and mucilaginous articles of diet were also recommended. All these deserve adoption. The principal question is, as to the diet which should be adopted. Dr. Stewart, some years ago, advised nourishing diet, cold sponging the surface, cold bathing, and exercise in the open air, and frequently with advantage. To persons of a relaxed habit, with a slow or natural pulse, and to those not suffering from febrile action, this plan is generally appropriate; very dilute acids, or lemonade, or common vinegar and water, being the usual beverage. He directed the whole surface of the body to be sponged in the morning; and the neck, breast, and shoulders at night, with tepid vinegar and water, gradually reducing the temperature to that of the surrounding air. After the sponging, frictions with flannel or the flesh-brush for half an hour were enjoined. Cold bathing and salt-water bathing were afterwards employed, and continued until recovery took place. Dr. Stewart advised this method in both febrile and non-febrile — in acute and chronic cases. In the non-febrile and chronic it is often serviceable, and, early in the febrile, it may also be occasionally useful. Sponging the surface, and assiduous friction immediately afterwards, are applicable to most cases; but the diet requires greater discrimination. Where fever is present, animal food increases the patient's ailments. In those, farinaceous glutinous, or mucilaginous substances only should be allowed, with goat's whey, stale butter-milk, grapes, raisins, the fruit of the carob or St. John's bean, asses' milk with Seltzer-water, &c.

141. *b.* The propriety of having recourse to repeated small depletions, or to a moderate blood-letting, about each equinox, in order to prevent the recurrence of hæmoptysis, has been insisted on by some writers, and when the effusion depends chiefly upon plethora or active determination to the lungs, the practice may be of service;

but when it occurs in the progress of tubercular phthisis, it may be injurious if indiscriminately adopted, although it may be of use in those cases in which subacute inflammatory action, or congestion of portions of the lungs, often complicate the tubercular formations, and occasion the sanguineous discharge. In the more asthenic states, depletions favour the progress of the tubercles, and are more or less injurious. The regulation of the excretions; the restoration of suppressed evacuations or accustomed secretions; occasional change of air; residence in a mild, humid, and equable climate; sea-voyaging; gentle exercise in the open air; flannel clothing next the skin; cold sponging the surface; acidulated drinks; light and nourishing food; mental quietude; and the avoidance of whatever depresses the vital powers, are severally productive of benefit: some of them ought not to be dispensed with. Exertions of the voice, playing on wind instruments, venereal indulgences, warm baths, and exposure to vicissitudes of the weather and season, ought always to be shunned. (See art. Tubercular Consumption.)

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VI. Hæmorrhage from the Stomach.

Syn.—*Hæmatemesis* (from αἷμα, gen. -ατος, blood; and εμεσις, vomiting), Linnæus, Sagar, Vogel, Sauvages, Pinel, Good. *Vomitus cruentus, vel vom. sanguis, vomitio sanguinis*, Auct. Lat. var. *Hæmorrhæa ventriculi*, Swediaur. *Gastrorrhagia; Æsophagorrhagia; Morbus niger; Fluxus splenicus*, Auct. *Vomissement de Sang, Hématémèse*, Fr. *Blutbrechen*, Germ. *Vomito di Sangue, Ematemesi*, Ital. *Vomiting of Blood.*

142. Defin.—*A vomiting of a dark-red, black, fluid, or a semi-coagulated blood, sometimes pure, at*

other times mixed with a ropy or watery fluid, or other matters contained in the stomach; preceded by nausea, oppression, tension or heat of the epigastrium, sometimes by faintness; unattended by cough; and frequently accompanied with very dark-coloured, grumous, or pitchy stools.

143. i. PATHOLOGY.—Like dropsy—of which it may be either an antecedent or epi-phenomenon — vomiting of blood is seldom an idiopathic or primary disease, but generally the consequence of certain pre-existing changes, sometimes chiefly seated in the stomach, at other times in the collatious viscera, as the spleen, liver, or pancreas, and occasionally in some two or more of these organs. The blood may proceed from the mucous surface of the stomach, which is most commonly the case; and from the surface of the duodenum, or of the œsophagus. It is generally poured out from the congested, dilated, and weakened capillaries and exhaling pores of this surface; but it may be effused either from a limited part, or from a few small vessels chiefly, as when it depends on a congested or other morbid state of the spleen, or on ulceration, or from one or more diseased or ulcerated vessels, which latter is but rarely the case. It may proceed, also, from the rupture of an aneurismal tumour which has poured its blood either directly or mediately into the stomach; or, as supposed by some to happen in a very few instances, it may even flow along the ducts from the liver into the duodenum, from whence it may be partly regurgitated into the stomach; but this is extremely doubtful. The blood may, however, as shown above, pass from the posterior nares, or throat, or from the respiratory organs, into the stomach, and be afterwards vomited; and thus hæmatemesis may be closely simulated.

144. Besides these sources of the hæmorrhage, it is of importance to recognise the general condition of vital energy of the system accompanying it, as well as the state of action which the heart and arteries may evince. Hæmatemesis is attended with almost every grade of vascular action, from the lowest state of sub-action, to the most acute action; but more frequently the vascular system is deficient of vital tone, and this condition is extended, more or less, to all the soft solids of the frame. In a very great number of cases of this disease, also, we observe a state either of general cachexia, or of congestion, morbid function, or morbid structure, of more than one of the abdominal viscera.

145. Hæmatemesis is, more commonly than is generally stated by authors, a mode of termination, or a consequence, of inflammation, or of inflammatory irritation and congestion of the internal tunics of the stomach and duodenum, particularly when it presents signs of sthenic action, or is preceded by cardialgia, acute pain, tenderness, distension, and a sense of heat in the region of this organ, or when it occurs in young, plethoric subjects, and is caused by ingurgitation, by acrid matters received into the stomach, by the use of inebriating fluids, and by the suppression of accustomed discharges. In this *inflammatory form* of the disease, the blood thrown from the stomach is seldom in large quantity at one time, although frequently ejected, and is of less deep colour than in some other varieties; and that taken by venesection is usually cupped and buffed. I agree, however, with QUARIN, RICHTER, FRANK, and SCHMIDTMANN, that this disease is more frequently accompanied with an asthenic, than sthenic, state of the vital powers.

146. It is of the utmost importance to appreciate justly the foregoing states, as upon them are chiefly based our opinions respecting the exact nature of the disease, and the most successful mode of removing it. In the following observations I shall notice —*first*, the primary and less complicated state of hæmatemesis; *secondly*, the supplemental, succedaneous, or vicarious forms of this disease; *thirdly*, hæmatemesis from disease of the viscera connected with the stomach; *fourthly*, hæmorrhage from certain organic lesions of the stomach, or of its vessels, and from complications with other diseases; and, *lastly*, that rarer form of hæmatemesis, which, from the colour of the ejected fluid, has been called the *morbus niger*.

147. *A. Primary or Simple Hæmatemesis.*— This form of the disease is entirely dependent upon the state of the mucous surface of the stomach, or upper portion of the duodenum. It may arise from a constitutional tendency to hæmorrhage, heightened in this particular part of the digestive mucous surface by some of the exciting causes of the disease, especially by an excessive use of vinous or spirituous liquors, or by both, and by general vascular plethora. It seems to be preceded by, and even to consist in, a more or less congested, weakened, or atonic state of the extreme venous capillaries arising in this surface, connected with similar states of this surface itself (see art. DIGESTIVE CANAL). But, conjoined with these states, there may exist increased action of the vessels supplying the bleeding surface. When it proceeds chiefly from the former of the conditions now referred to, there are generally appearances of deficient tone throughout the soft solids of the body. The blood ejected is dark-coloured, or grumous; and although there may be pain or tenderness of the epigastrium, there is no sense of heat, or sign of increased or sthenic vascular action.

148. When it depends more upon local determination, or increased action, arising from an irregular distribution of the vital energies with which the vascular system, or particular viscera, is endowed; or when it is consequent upon the state of inflammatory congestion referred to above (§ 145.), the vomiting of blood is either preceded by, or accompanied with, a frequent, soft, open, and sometimes small, pulse, by a sense of pain or tenderness, and of heat, at the epigastrium, with other symptoms of gastritis; and the blood thrown up is redder and more fluid than in the foregoing case, and seldom in very large quantity; but is sometimes mixed with portions of lymph, or with substances of a fleshy or fibrinous appearance. This particular state of the disease is often connected with a plethoric state of the vascular system, particularly of that part forming the portal system. When this obtains, the history of the case, the preceding causes, and circumstances connected with it, will assist us in forming a diagnosis. The patient generally is of a full habit of body, or he presents appearances of vascular plethora. The pulse is full, broad, and strong, and there is often fulness of the abdomen, particularly towards the epigastrium and hypo-

chondria, but without that degree of fulness, tumefaction, pain, or tenderness in the hypochondria, which attends upon serious disease of the spleen or liver, and which accompanies the third variety (§ 151.). This form of hæmatemesis in delicate constitutions, or in those predisposed to hæmorrhagic disease, occasionally follows upon acrid or irritating substances taken into the stomach. Thus it has been produced by the irritation of an emetic, and by acrid poisons. Warton, Glisson, and Hoffmann, have observed it occasioned by the use of irritating emmenagogues. It may assume a chronic, remittent, or periodic character. In two instances, in which it was occasioned by the daily excessive use of intoxicating liquors, it recurred every morning for several weeks; and, in one of them, was followed by a most violent attack of gout.

149. *B. Succedaneous or Vicarious Hæmatemesis.* — This form of the disease is not of infrequent occurrence. It is noticed by several authors, and particularly by Ballonius, Hoffmann, Forestus, Whytt, Riedlin, Thomann, Pinel, and others, and has come before every experienced practitioner oftener than once. It generally arises from those causes which suppress suddenly, or prevent the return of, the *menstrual discharge*, or the *hæmorrhoidal flux*. It may even replace an habitual *epistaxis*, or occur in females in the form of misplaced catamenia, this part of the uterine functions not having appeared. In the majority, however, of such cases, the hæmatemesis has been occasioned by some evident cause, and in its subsequent occurrence, it has assumed a periodic or vicarious form. This form may even manifest itself from the commencement, as where it has occurred instead of the catamenial evacuation, which has either not appeared, or been but imperfectly established.

150. From whatever cause this state of the disease may proceed, it evidently arrests or prevents the discharge the place of which it supplies; and, although it cannot be generally shown to depend upon previously existing disease of the stomach, or of the viscera intimately connected with this organ, yet we may suppose that the mucous surface and vessels of the stomach have been disposed to experience congestion, local determination, or the morbid conditions on which hæmorrhage has been shown above to depend. Possibly, also, the morbid states of the surrounding viscera may have been such as to assist in producing the hæmorrhage, although these states cannot be generally recognised, owing either to their slight extent, and the obscure or imperfectly developed phenomena attending them, or to our imperfect powers of observation. When hæmatemesis is consequent upon, or vicarious of, hæmorrhoids, particularly in aged or intemperate persons, a morbid state of the liver, as respects either its functions or its structure, as well as of the stomach, may reasonably be inferred, so far at least as to lead to an intimate examination of the state of this organ. Admitting the frequency of this morbid relation, we cannot, however, infer its constant existence, seeing that we often fail in detecting it, and of observing it after the hæmatemesis has ceased. It seems, therefore, more correct to infer that, in cases of this description, the sanguineous effusion is often a consequence of inflammatory congestion of the villous coat of the stomach and duodenum, which has taken place more suddenly, and induced more rapidly the effusion than in some other forms of the disease.

151. *C. Hæmatemesis from Disease of the Viscera connected with the Stomach.* — The vomiting of blood in this form of the disease is *symptomatic* of congestion or structural change of the spleen, liver, or pancreas, or even of some other abdominal viscus. This is the most frequent form of hæmatemesis. A congested state of the stomach, and even also of the duodenum, being caused by obstructed circulation through, or other disease of, one or more of these viscera, any accidental irritation, or whatever increases the congestion on the internal surface of the stomach, may occasion the effusion of blood from it. Most frequently, perhaps, the hæmorrhage is produced by obstruction, enlargement, or some other lesion of the spleen, the anastomoses of the vessels of this organ with those of the stomach favouring its occurrence. When hæmatemesis arises from disease of the liver or spleen, the history of the case, the presence of fulness or tumefaction, tenderness or pain, in the hypochondria and epigastrium; symptomatic pains about the shoulders or shoulder-blades, an unhealthly or sallow state of the countenance, and chronic functional disorder of the stomach and bowels, will generally be observed. The discharge of blood in this form of hæmatemesis has sometimes acted as a critical evacuation, the symptoms of congestion of the liver or spleen, or of both, which had existed, having been removed by it, and health restored. Instances of this kind have been recorded by De Haen, Frank, Portal, Pinel, Schmidtmann, and others, and have occurred to myself, particularly in persons who had suffered long from ague. More frequently, however, the hæmorrhage has furnished only a temporary advantage, the disease of the liver or spleen, which it had relieved, again returning, followed by an attack of hæmatemesis and another period of relief; or terminating fatally, dissection disclosing the extent of the disease of which the hæmorrhage was merely a symptom. In this variety, the blood thrown up is generally of a dark colour, and either fluid or grumous, and consisting of small coagula. The stools are also morbid — frequently black, pitchy or grumous, loose, and very offensive. The hæmorrhage is often preceded by, complicated with, or followed by, dropsy of the abdomen, or of the lower extremities, or both; but rarely with hydrothorax, unless it have followed the effusion into the peritoneal cavity. In some instances, obstinate diarrhœa or dysentery has supervened, especially in warm or miasmatous climates.

152. I agree with Tralles (*De usu Opii*, vol. ii. p. 29.), who has strongly insisted on the frequently active or sthenic state of the vessels in hæmatemesis, that, in the preceding forms, the impeded or obstructed return of blood through the veins frequently occasions an augmented action of the arteries; and, as the blood cannot pass in sufficient quantity, or with requisite celerity, by the veins, that it is determined with greater impetus into the extreme arterial capillaries, thereby dilating their exhaling pores, and being effused into the cavity of the organ. Some degree of vascular reaction may also take place

on the villous surface of the stomach from this circumstance, giving rise to the membranous pieces of lymph which are sometimes ejected along with the blood, or subsequently.

153. *D. Hæmatemesis from Disease of the Coats or Vessels of the Stomach, and from other Maladies.* — The discharge of blood from the stomach may arise from ulceration having extended into one or more vessels; or from disease of the coats of an artery or vein, or from atheromatous or other deposits in the coats favouring their perforation or rupture. Such occurrences are, however, very rare. In a case of extensive and fatal hæmatemesis consequent upon scirrhus of the pylorus, in an aged man, attended by Mr. Byam and myself, the arteries of the stomach were found studded by atheromatous deposits, and the coats of a considerable arterial branch were at one part destroyed by them, an opening from the interior of the vessel into the stomach having been detected after a minute examination. The effusion may even proceed from perforation and adhesion of the stomach to the liver or spleen, ulceration having extended to these viscera. It may also occur in an advanced stage of scirrhous ulceration of the pylorus or cardia; or from tumours, particularly those of a malignant character, in the parietes of the stomach; but in these cases the hæmorrhage seldom proceeds from the ulcerated part, or from the tumour, unless they be of a fungoid kind, the blood being exuded chiefly from the villous surface of the organ. Hæmatemesis may be also occasioned by any lesion causing hæmorrhage from the internal surface of the œsophagus, or from the bursting of an aneurismal tumour or varix in this situation as well as in the stomach itself. When the effusion takes place from the œsophagus, the blood generally passes in the first instance into the stomach, whence it is ejected with the contents of this viscus by vomiting; but it is sometimes eructated or gulped up without nausea or retching.

154. Blood is occasionally thrown off the stomach in the progress of continued fevers, particularly of those of an adynamic or putro-adynamic form; and of those complicated with predominant disease of the stomach, liver, or spleen. It is also sometimes vomited in long-continued remittent and intermittent fevers, and more rarely in the exanthemata. Hæmatemesis has even ushered in severe attacks of smallpox and scarlet fever; and has sometimes supervened in the course of hooping-cough, particularly in plethoric and cachectic persons, and in those affected with visceral disease. It is not unfrequently symptomatic of scurvy or purpura hæmorrhagica; the blood being exuded from the extreme vessels in consequence of deficient tone and weakened vital cohesion of the villous coat of the stomach, and of the whole digestive canal. In these latter complications, the quantity of blood evacuated by stool is often greater than that thrown off the stomach. Lastly, hæmatemesis sometimes occurs in persons affected by intestinal worms, especially tænia and lumbrici. It is, moreover, occasionally complicated with hysteria and disorder of the uterine functions. It not infrequently alternates with, or is supplemental of, some other hæmorrhage.

155. In the first and second of the foregoing states, constituting the more *idiopathic* varieties of hæmatemesis, as well as in the third and fourth, forming the *symptomatic* and *complicated* conditions, the appearance of the stools is the next deserving of attention to the quantity and state of the blood thrown off the stomach. In many cases, the quantity of blood passed from the bowels is greater than that vomited. This happens most frequently when the blood is slowly effused, without irritating the stomach. It then passes the pylorus, and undergoes a partial digestion, or mixes with the secretions poured into the alimentary canal; imparting a very dark colour, or pitchy or black grumous appearance, to the stools.

156. *E. Vomiting of Black Matter* — the *morbus niger* of the ancients. — When the blood continues long congested in the capillaries of the stomach previous to its effusion, it gradually acquires a dark colour, and loses the property of coagulating. When, also, the congestion of the venous capillaries has continued long, the arterial ramifications passing into them necessarily participate in this state, the blood in them assuming venous characters. This condition of the circulation of the organ sometimes occurs, especially in persons of a spare habit of body, of a morose, irascible, and melancholic temper; and of a pale, sallow, or jaundiced countenance; and is attended with, or followed by, pain and distension in the epigastrium and left hypochondrium, flatulence of the stomach, debility or sinking, borborygmi or tormina, and several other symptoms usually indicating the approach of hæmatemesis. At length, during great prostration of strength, or deliquium, followed by nausea, and sometimes colicky pains of the abdomen, vomiting of a black tar-like matter takes place, often with similar discharges from the bowels. This matter is occasionally extremely offensive, and is evidently the result of serious changes in the vital action of the vessels of the stomach, liver, and spleen; the tone of the capillaries, and the healthy cohesion of the digestive mucous surface, being lost, and thereby allowing the exudation of the altered blood into the cavity of the organ, this fluid becoming still further changed by admixture with the acid gastric juice and exhalations poured out by the villous surface. It will be seen from this, that I consider the discharge of a black matter from the stomach as a modification or variety of hæmatemesis, occurring in an extremely asthenic state of the frame, and most probably from some degree of perverted function, not only of the stomach, but also of the liver and spleen. It may be also inferred that a morbid state of the secretions from the mucous follicles and liver may co-exist with these changes, and that the admixture of those secretions with the effused blood may deepen the already dark colour of this fluid; but this effect is chiefly produced by the free acid shown by Dr. Prout to exist in the gastric juices.

157. ii. Causes.—*A.* The *predisposing causes* of hæmorrhage from the stomach are, — hereditary conformation and disposition to hæmorrhagic affections; the female sex; the sanguine and irritable temperaments, and the melancholic and the hypochondriacal, especially in persons with a pale, sallow, or earthy appearance of countenance; the full and plethoric habit of body, and irascible disposition; indolent and luxurious modes

of life, particularly when adopted soon after puberty; addiction to the use of spirituous liquors, or of inebriating fluids of any description; indulgence in too much food; the continued influence of moist and miasmal states of the air; chronic affections and congestions of the abdominal viscera, particularly of the spleen, liver, and pancreas; the advanced months of pregnancy; and irregularity or suppression of the menstrual discharge. J. P. Frank states that he has met with hæmatemesis most frequently between the thirtieth and and fiftieth years of age.

158. *B.* The *exciting* and *determining* causes are — blows and injuries on the abdomen, particularly on the hypochondria and epigastrium; violent concussions or succussions of the trunk; external or internal pressure on the stomach; the ingestion of irritating or hurtful matters into this viscus; the intemperate indulgence in food or stimulating liquors; the presence of worms, larvæ, leeches, &c., in the stomach or upper part of the intestines; the irritation occasioned by morbid or excoriating bile on the surface of the duodenum or stomach; powerful or irritating emetics, especially when given in the advanced stages of fevers, or in cachectic or visceral diseases; the suppression of accustomed discharges, particularly the menstrual or hæmorrhoidal; the application of cold, or of cold and moisture, to the lower extremities or surface of the body, during perspiration or the catamenial period; unusual distension of the colon, owing to habitual or continued costiveness; neglect of the bowels, and consequent accumulation of fœcal matters; violent fits of passion; disease of the vessels of the stomach, or collatitious viscera; the gravid uterus, and large tumours developed in any part of the abdomen. Whatever, in short, irritates the mucous surface of the stomach, or interrupts the return of blood from the organ, will occasionally produce the disease.

159. iii. Symptoms.—*A. Premonitory Symptoms.* —The patient generally complains, previous to the accession of the hæmatemesis, of many of the symptoms of hæmorrhagy, as well as of others peculiar to this species. These are commonly, cardialgia; tension or pain at the epigastrium, with either loss or increase of appetite; sometimes faintness, or a sense of sinking or of anxiety at this region; flatulent or acrid eructations; lassitude, with irregular chills and flushes of heat; an open, sharp, and soft pulse; a sense of pain, or heat and uneasiness, with distension and tenderness at the epigastrium and left hypochondrium. Sometimes the pains in these situations are severe and pulsative, or extend to the left shoulder and scapula; and there is generally more or less of nausea, expression of anxiety, and pallor of the countenance. In rarer instances the attack commences without any premonitory symptoms sufficient to attract attention; and cases even of death from hæmorrhage into the stomach have been observed by Frank (*De Cur. Hom. Morb.* t. vi. p. 198.) and others to have occurred suddenly, without any external discharge or symptom indicating the cause of sudden dissolution. In some instances I have ascertained that, for a long time previously, evident symptoms of chronic gastritis had been present, of which the hæmatemesis was a consequence.

160. *B.* The *pathognomonic* phenomena of the disease soon succeed to the above: the nausea is followed by increased pain, uneasiness, and tenderness at the epigastrium, and with vomiting of blood, either fluid or coagulated, pure, or mixed with the contents of the stomach. The blood, and other matters thrown up, come away with more or less effort; frequently with comparative ease, even when the hæmorrhage is the greatest, and seldom with much previous retching: it is sometimes gulped or eructated upwards. When the quantity of blood thrown up is great, the effort at ejecting it may sometimes occasion irritation in the pharynx, and excite coughing; and, from this circumstance, cause some doubt as to the seat of effusion; but the history of the case, and an attentive examination of the phenomena (§ 159, 160.), will show the nature of the disease.

161. The appearance of the blood varies with the quantity effused, and the time it has been retained in the stomach, but especially with the state of the vital energies, and of vascular action, previous to, and at the time of, the hæmorrhage. Where the discharge is attended by increased action, and the quantity is large, or when it has been poured from a considerable vessel or vessels, the blood is generally pure and unmixed with the injesta. Where it has been effused from an artery or ruptured aneurism, it is florid and fluid; but if it have slowly oozed from the congested mucous surface, or depended upon congestion or other disease of the spleen or liver, it is of a dark venous colour, sometimes grumous, at other times fluid, and either pure, or mixed with the secretions or other matters contained in the stomach. In some cases (the *morbus niger* of old authors) the blood is nearly black, of a tar-like hue, or grumous, particularly in the hæmatemesis occurring during the progress of old remittent and malignant fevers, where there has evidently existed for some time impaired tone of the mucous surface of the stomach and of its capillaries, and of the vessels of the spleen, with congestion of these viscera, and obstruction of the liver.

162. In some instances, particularly when the disease has been preceded by inflammatory symptoms referable to the stomach, membraniform, polypous, or fleshy substances, are found amongst the coagula ejected from this viscus. These substances evidently proceeed from inflammatory action in a part of the villous surface, with effusion of coagulable lymph, this action being followed by, or accompanied with, or even consequent upon, a more or less active hæmorrhage.

163. After hæmatemesis, the patient often experiences much relief from the more severe symptoms ushering it in; and this continues until shortly before a return of the attack, which may be repeated oftener than once, with intervals of relief of irregular duration. When the effusion of blood into the stomach is continued for a prolonged period, the vomiting of this fluid is repeated at short intervals. And occasionally the hæmorrhage occurs, particularly in those addicted to ingurgitation and the immoderate use of spirituous liquors, in short and slight fits, at short and regular intervals. I have remarked it, particularly in persons of a full habit of body who have been addicted to those indulgences, recur every morning, even for several weeks or months, with temporary relief to all the symptoms, and disappear

only occasionally for longer periods than 24 hours. Sometimes a single attack of considerable severity is followed by many months of comparative health; and when it is critical of engorgement of the spleen or liver, it may not again return, under proper treatment. When hæmatemesis is succedaneous or vicarious of some other accustomed sanguineous evacuation, it often recurs at regular intervals, as in the second variety of the affection. After an attack, the bowels are generally relaxed, and the dejections dark-coloured, from the presence of blood in them, and extremely fœtid. Sometimes the stools are quite black, and of the consistence and appearance of tar. This state of the evacuations (*the melæna* of old authors) often continues for some time after the vomiting has ceased; and they are often preceded by colicky pains through the abdomen, distension, flatulence, tormino, and even slight meteorismus.

164. There is seldom much fever or heat of surface; but the pulse is quickened, sometimes full and developed, or even strong, in the more active or sthenic states of the disease, particularly at the commencement of the attack. But in the asthenic states of the system, or as the disease advances, and the attacks are repeated, it is commonly small, soft, and accelerated, and occasionally very compressible and open. The tongue presents various appearances, which depend more upon the concomitant and primary lesions producing the effusion of blood, than upon this occurrence alone. It is sometimes furred, but more commonly loaded at its base, or coated with mucus merely, or it is red, particularly its point and edges, and lobulated, or fissured: sometimes it is apparently raw and livid, particularly in the worst cases.

165. *C. Appearances on Dissection.*—There are few lesions to which the stomach and other abdominal viscera are liable, that have not been found in fatal cases of hæmatemesis. The chief of these, particularly in the primary forms of the disease, are — dark red, purplish, brown, or black patches, streaks, or spots, of the internal surface of the stomach; an enlarged, dilated, or injected state of the capillaries in this surface, permitting, according to the observations of PORTAL, injections thrown into the gastric arteries to pass into the cavity of the viscus; very rarely rupture of any of the vessels, excepting in connection with ulceration, or atheromatous deposits in their coats; generally a relaxed state of the vessels, with diminished cohesion, or a softened, dark-coloured, blackened, tumid, infiltrated, ecchymosed, and flabby condition of the villous and sub-villous tissues; occasionally a flaccid, dilated, and pale state of the whole organ, the vessels having been emptied by the hæmorrhage; sometimes similar alterations to the above of the internal surface of the duodenum, or of the œsophagus, either independent of (GAUBE, in *Rev. Med.* t. i. p. 394. 1825), or associated with, the foregoing lesions of the stomach; collections, varying much as to quantity, of coagulated, semi-coagulated, or grumous, dark-coloured blood in this viscus, and in the duodenum, and of a still darker, pitchy, and fœtid blood, mixed with morbid secretions and fœcal matters, in the intestinal tube; and a nearly empty state of the veins. In some cases, especially of the symptomatic forms, the mucous surface of parts of the small or large intestines presents similar appearances to those seen in the stomach. In a few instances, there is but little change from the healthy state of this viscus, the principal morbid changes existing in the liver or spleen, or in the pylorus or œsophagus; and, in a few others, the mucous membrane is red, injected, and covered in parts by a layer of coagulated lymph or of jelly-like fluid. In addition to one or several of the above lesions, there have been observed, in rare cases, erosion of one or more arterial vessels (RICARD, LATHAM, CLARK, and myself) of the stomach; a dilated or varicosed state of the veins (RULLIER), and even rupture of the varicosed veins (STOLL, ROZIERE); great dilatation of the vasa brevia, the meseraic, mesocolic, and splenic veins, and ulcerations and perforations of the œsophagus and duodenum, as well as of the stomach.

166. In the more decidedly symptomatic and complicated states the various alterations to which the abdominal viscera are liable are severally observed, but those which are more directly connected with hæmorrhage into the stomach are — congestion, enlargement, and softening of the spleen, its vessels containing a black, semicoagulated, or grumous blood; unusual hardness and diminished size of this viscus, portions of it being converted into cartilage, and deposits of bone on its surface; congestion, tubercular formations, interstitial deposits, tumours, scirrhus, atrophy, and other changes in the liver, causing obstruction of the portal circulation; tumours pressing upon the vena porta, and lesions of its coats, or of parts connected with it, diminishing its calibre; enlargement or scirrhous tumours of the pancreas (VAN DOEVEREN, myself, and others); alterations of the coats of the large vessels, and aneurisms, particularly of the aorta, opening either directly or mediately into the stomach, or œsophagus; adhesions of the spleen to the stomach, with perforating ulcers of the latter, penetrating into the former; fungous or other tumours of the stomach or pylorus (WHYTT, NIEMANN, PORTAL, &c.); scirrhus of the cardiac or pyloric orifices, tumours developed at the root of the mesentery, and organic changes of the kidneys. The most common of these are, the alterations of the spleen and liver, especially enlargement of the former, and lesions of the whole structure of the latter; changes affecting merely a part of the organ, or not materially obstructing the portal circulation, having but little influence in the production of hæmatemesis.

167. *D. Pathological Inferences.* — From the phenomena observed in connection with this disease, both during life and after death, it may be inferred — 1st. That the effusion of blood into the stomach is sometimes a termination or consequence of active congestion, or of inflammatory irritation, of the villous surface of this viscus, and sometimes also of the parts of the digestive tube adjoining it—*inflammatory hæmatemesis;*—2d. That the hæmorrhagic discharge frequently arises from interrupted circulation in the spleen or vena porta, or both, and consequent congestion of the veins and venous capillaries of the stomach, causing increased action of the arteries, with dilatation of, and consequent effusion from, the exhalent pores of the congested surface — *congestive symptomatic hæmatemesis;* — 3d. That the effusion occasionally proceeds from diminished or lost vital cohe-

sion of the villous surface, and impaired tone of the capillaries of the stomach, with general adynamia—*asthenic symptomatic hæmatemesis*;—4th. That, in rare instances, the hæmorrhage arises from an aneurism, from ulceration or perforation of an artery or vein; and more frequently from malignant, fungoid, or ulcerated tumours in the stomach, or near either of its orifices, &c. — *complicated hæmatemesis.*

168. iv. Diagnosis.—The vomiting of blood is no proof that this fluid is effused primarily from the stomach, or even from the œsophagus or duodenum; for, as I have shown above (§ 91. 99.) very dangerous hæmorrhages often proceed from the posterior nares, fauces, or pharynx, and even from the respiratory organs, yet but little blood escapes externally from these situations, the greatest quantity passing into the stomach, whence, if it be considerable, it is afterwards thrown off by vomiting. Where the hæmorrhage takes place slowly, hæmatemesis does not occur, the blood having nevertheless flowed into the stomach, and thence into the intestinal canal, admixing with the secretions and alimentary matters, and colouring the dejections. Hence the presence of this fluid, even in the stools, is no proof that it has been effused either in the stomach or duodenum, as it may have been, as now stated, poured out from the œsophagus, or from the throat, &c., and have passed downwards instead of upwards. In cases, however, of hæmorrhage from the superior portions of the digestive tube, the blood is more or less changed or intimately mixed with the intestinal secretions and fœcal matters; and the stools present, in their black colour, or their grumous, sanious, or tar-like appearance, indications of considerable remora, or of partial digestion of the effused blood in the alimentary canal. — These appearances may be thus modified, not only by this circumstance, but by the action of the acid in the gastric juice, or by acidity in the bowels, and by admixture with the biliary and pancreatic fluids. They will necessarily also vary with the quantity of blood effused, with the particular seat of effusion, with the state of the system, and with various concomitant circumstances, in respect of the causes and states of the digestive viscera.

169. The diagnosis, therefore, of true hæmatemesis from the vomiting of blood consequent upon the passage of this fluid into the stomach from the pharynx and adjoining parts, requires more attention than has been directed to it; and it is chiefly from a careful inquiry into the history and phenomena of the case, and from the premonitory symptoms referable to the stomach, spleen, or liver, that a correct opinion can be formed.—Where these symptoms have ushered in hæmatemesis, there need hardly be a doubt as to the stomach being the seat of effusion, and in this case the blood is very often dark-coloured, grumous, or coagulated, mixed with portions of ingesta, or with a pale or colourless ropy fluid, or with bile. In some cases, the passage of the blood over the glottis occasions more or less cough, and causes some doubt as to the source of hæmorrhage. In these, however, as well as in others, the absence of the symptoms ushering in, and characterising, *hæmoptysis* (§ 98, 99.), will distinguish *hæmatemesis* from that form of hæmorrhage. The dyspnœa, the bubbling sensation in the trachea and about the top of the sternum, the florid and frothy appearance of the blood, or the presence of bubbles of air in it, are all present in the former, but are absent in the latter. Dr. Watson very justly remarks, that the symptoms usually succeeding the hæmorrhage, in either variety, afford much assistance in forming a judgment in some doubtful cases. Generally copious *hæmoptysis* proceeds for some time in a succession of mouthfuls, whereas there is mostly only one access of full *vomiting*; and, at the close of the former, the patient manifestly coughs up and expectorates smaller quantities of blood, whilst, a few hours after the latter, slight griping pains are felt in the abdomen, and stools such as I have above described are passed.

170. Other circumstances, also, connected with the diagnosis of hæmatemesis, ought not to be overlooked, especially the visceral diseases of which it is frequently a consequence, and the affections upon which it may be contingent, or of which it may be supplemental or vicarious. When blood is vomited in the course of *cancer* or *scirrhus* of the stomach or of its orifices, besides the symptoms indicating these maladies, this fluid is generally changed to a dark or black, grumous, or even inky appearance. When hæmatemesis occurs in the course of *scurvy* or of *purpura*, the circumstances are generally such as to leave us doubt as to its source. If it take place after a fit of *hooping-cough*, it is often difficult to determine whether the blood be discharged from the stomach, or from the respiratory passages; but attention to the phenomena just pointed out (§ 168, 169.) will obviate any error. When hæmatemesis proceeds from a ruptured *aneurism*, or from an ulcerated or ruptured vessel, the quantity of blood thrown up is generally great, and unmixed with other matters, and sometimes more or less florid and fluid. The exhaustion, fainting, pallor, and sinking attending it, are extreme, and a fatal result occasionally soon supervenes; but more frequently the exhaustion and sinking or syncope arrests the hæmorrhage, and the patient apparently makes a short or slight progress in recovery; but after some mental or phsyical excitement, or after slight exertion, the hæmorrhage recurs, and death either takes place, or another respite is obtained. In many of these extreme cases, a great part of the effused blood is retained, and found in the stomach and intestines on dissection.

171. v. Prognosis.— In proportion to the severity of the symptoms referable to the stomach, liver, and spleen, particularly the pain, tenderness, anxiety, and fulness in these situations, the danger may be considered great. When these are very distressing, the quantity of blood ejected considerable or excessive, dark-coloured, pitchy, fœtid, or grumous; when the vomiting is attended with sinking, with a very quick, weak, small, or an open and compressible pulse, or with signs of cachexia, and of organic disease of any of the abdominal viscera; if it be preceded by symptoms of inflammation of the stomach and adjoining viscera; if it have proceeded from acrid poisons, or from severe injury; if it be attended or preceded by dropsy, jaundice, hypochondriasis, or a sallow, sunk, earthy, or waxy state of the countenance or general surface; if fainting or syncope come on and be protracted, or recovery

from them imperfect; if the eyes be sunk, the features pallid and sharp; if there be great distension and tenderness at the epigastrium and left hypochondrium; and, lastly, if the patient have cold extremities and cold sweats, the danger is generally great, and, with the latter symptoms, extreme. — If the symptoms ushering in the attack, or preceding it for some time, be either imperfectly mitigated, and still more if they be increased by the discharge of blood, an unfavourable inference as to the issue may be formed. If hæmatemesis occur in the last stage of fevers or of the exanthemata, in the old and cachectic, in persons who have gone through a long course of intemperance, or who have laboured under chronic abdominal disease, particularly if the hæmorrhage be great, or impart not relief if moderate, danger may be inferred, although it may not be immediate in the latter circumstances.

172. When, on the other hand, the disease has been caused by a fit of anger, by the suppression of an accustomed evacuation — as the catamenia, hæmorrhoids, epistaxis; or if it be vicarious of these, or when it has occurred on the disappearance or suppression of an external discharge, eruption, &c. the patient being otherwise healthy, or not far advanced in life; if the hæmorrhage is not excessive, or very frequently repeated; if the premonitory and attendant symptoms be not severe; and if the attack be soon followed by relief, and a return of the appetite and digestive functions; if the abdomen and hypochondria be without tenderness, unnatural fulness, or tumour, upon an accurate examination, the prognosis may be favourable. Yet an attack of hæmatemesis should be always considered deserving the utmost attention and skill of the physician.

173. It has been generally stated, that periodic hæmatemesis vicarious of menstruation is unattended by danger; but there are many exceptions to this, arising from circumstances alluded to above (§ 171.). Mr. North met with two cases of this form of the disease which terminated fatally. Upon the whole, therefore, the prognosis ought entirely to depend on the nature of the case, the age of the patient, the state of vital power and vascular action, and especially upon the complication, and the visceral lesions from which the attack proceeds. Dr. Schmidtmann states, that in plethoric patients, and in cases not characterised by much visceral disease, hæmatemesis seldom proved fatal in his practice; and my experience confirms this result. In one case, where it recurred almost daily, a violent attack of gout and the subsequent regimen have prevented its recurrence for years. Hoffmann found five cases fatal out of eight, in those depending upon visceral disease, and broken down powers of the frame. When hæmatemesis assumes or even approaches to the characters constituting the *morbus niger* of the older writers, or indicating structural or malignant disease of the stomach or its orifices, the prognosis must be extremely unfavourable.

174. vi. Treatment. — The *indications* are — 1st, to prevent, or to arrest the attack; 2d, subsequently to remove the pathological conditions, on which the hæmorrhage depends. — *A.* The physician has seldom an opportunity of prescribing for the premonitory symptoms of hæmatemesis; but cases sometimes present themselves, in which it is necessary to have recourse to means, when these symptoms recur, *in order to prevent the seizure.* — In these circumstances, a moderate venæsection or cupping over the hypochondria, warm mustard pediluvia, a full dose of calomel, followed by cooling purgatives, cathartic enemata, cooling diaphoretics conjoined with demulcents, and spare farinaceous diet, will generally be efficacious, especially if excited or sthenic action be present. If the powers of life be depressed, instead of the bloodletting, a sinapism, or the warm turpentine epithem, may be applied over the region of the stomach. If the attack is apparently supplemental of hæmorrhoids, or of the catamenia, leeches may be applied around the anus, or near the groins, and aloetic purgatives should follow a full dose of calomel. A blister, or stimulating plaster, may also be applied to the sacrum. In cases of obstructed catamenia, cathartic enemata, with a full dose of spirits of turpentine, may be administered.

175. *B. During the attack,* the treatment must be directed conformably with the principles inculcated above. The question as to the propriety of arresting the hæmorrhage should hardly be entertained in this disease more than in hæmoptysis (§ 136.); for, although the hæmorrhage may sometimes proceed with less risk in the former than in the latter, or even occasionally with advantage; yet, as the quantity of blood thrown up from the stomach is no sure indication of the amount effused, and as the ends likely to be fulfilled by the internal discharge may be more safely attained by treatment, even when circumstances seem most favourable to the allowing of the hæmorrhage to proceed, it will be safer, as a general rule, to employ appropriate means to arrest the attack, and at the same time to accomplish all that the unrestrained effusion could have produced. Even in cases of supplemental or vicarious hæmatemesis, when it is supposed by some advantageous to allow a free discharge, danger may result; for the hæmorrhage may be fatal, although little blood is vomited, the stomach and intestines being filled with the effused fluid.

176. *a.* For hæmatemesis the means of cure are to be selected according to existing pathological conditions. In plethoric and robust persons; in cases depending upon congestion of the liver or spleen, or upon suppressed discharges; and where indications of increased or sthenic action are present — in those circumstances that might indicate the propriety of allowing a copious effusion to take place, it would certainly be improper to arrest the disease at its commencement by the internal use of powerful astringents; but it would be judicious to do so, by removing the pathological states of which the hæmorrhage is the effect, by *venæsection* — copious or repeated, according to circumstances; by *cupping* over the hypochondria; by *purgatives* and cathartic enemata, and by external *derivations.* In these, the more active states of hæmatemesis, *refrigerants,* cooling *diaphoretics,* and the other means advised in similar states of hæmorrhage (§ 35. *et seq.*), may be also employed. Whenever the disease continues, notwithstanding free vascular depletion, and external derivation, there can be no doubt of the propriety of having recourse to the more powerful astringents. In the more active forms, however, a full dose of *calomel,* followed in a few hours by a

purgative draught, and this by a cathartic enema, so as to procure copious alvine evacuations, should precede astringents. When the hæmorrhagic discharge is so copious as to forbid the delay which this practice would occasion, the calomel should be followed, in a very short time, by a full dose of oil of *turpentine*, given on the surface of milk, or of some aromatic water, or of this medicine conjoined with castor oil. If this draught be thrown off the stomach, it should be repeated; and it may be even again preceded by the calomel. Notwithstanding its usual nauseating effect, turpentine is generally retained in hæmatemesis; and it allays the vomiting, by arresting the hæmorrhage. It may be given in any dose, from twenty to thirty drops, every half hour, to half an ounce or more at considerable intervals; it may also be administered in *enemata*, or applied externally in the form of *liniment* (F. 311.) or *epithem*. I have resorted to this practice upwards of twenty years, and am convinced that it is safer and more generally appropriate than any other yet recommended.

177. *b. Cold*, in various modes of application — as in enemata, applied over the epigastrium, iced fluids, lemon and other water ices, taken into the stomach — has been directed in active hæmatemesis, and is often efficacious. But this treatment, as often merely suspends the hæmorrhage, which returns as soon as it is relinquished — sometimes with greater violence. It occasionally also merely checks the vomiting, while the sanguineous effusion still continues. It requires caution and discrimination, and ought not to be confided in alone, when the discharge is very profuse, or the case urgent. Where enlargement, or passive congestion, of the liver or spleen exists, the propriety of this practice is very doubtful. In passive hæmatemesis it is injurious. — *Nitre* (F. 95. 294. 644.) or *muriate of ammonia* (F. 864.) may also be tried in the active states of the disease, as being appropriate to them.

178. *c.* Of the *astringents*, the acetate of lead in large doses, with opium, or with pyroligneous acid, acetate of morphine, and kréosote, is the most efficacious. In the latter combination I have lately seen it successful. The combination mentioned above (§ 131.), as constituting Ruspini's styptic, or the *styptic solutions* prescribed in the appendix (F. 9—12.), or the *astringent balsams* (F. 8—22.), the subnitrate of bismuth or sulphate of zinc, with narcotics, and most of the substances already noticed under this head (§ 40, 41.), will often be of service. In the *passive*, or profuse states of the disease, the more tonic astringents — as the tincture of the muriate of iron, the oil of turpentine with aromatics, the sulphates and sulphuric acid with opium (Vogel, Ruland, Vicat), and infusion of roses; alum in milk-whey (Ström, Willich, Lindt, &c.), are generally useful.

179. *d. Emetics*, especially the sulphate of copper, or of zinc, are efficacious in some cases. They have been employed by Richter and Keck. — Dr. Sheridan states, that both he and his father have resorted to ipecacuanha emetics in hæmatemesis with general success. Very recently the secale cornutum has been recommended; and I have lately employed the *kréosote* in two cases with benefit, and have conjoned it with pyroligneous acid, acetate of lead, and acetate of morphia. — Camphor is mentioned by Marcard, but it is useful chiefly as an adjunct to other means. The acid formed by the fermentation of buttermilk or whey is noticed by Van der Haar. I have seen it employed in some northern parts of Europe with benefit. Blistering the epigastrium is directed by Vogel and Togenburgher, and should not be neglected, if the other modes of counter-irritation already noticed (§ 36. 47.) be not adopted. Of the various anodynes, opium has been justly preferred by Young, Jones, Roeschlaub, Dorffmüller, and Marcus; the salts of morphine are now frequently employed, the one most congruous with the other substances prescribed being selected.

180. *C. The Treatment after the attack* is often of greater importance than that of the attack itself. It is chiefly then that the pathological states producing it can be removed. The means of cure should have strict reference to these states (§ 146.), and especially to those of the liver and spleen. There are few cases in which a judicious, regular, and persevering use of mild *purgatives* will not prove serviceable. When there is enlargement or engorgement of the liver, deobstruent and chlologogue aperients, occasional cupping below the right shoulder-blade, and a mild farinaceous diet, are required; calomel, blue pill, Plummer's pill, taraxacum, the supertartrate of potash, and the neutral salts, being the most appropriate aperients. When the spleen is enlarged, purgatives are also necessary; but they should either be conjoined or alternated with tonics; and calomel be either laid aside, or be given with caution. In either state, purgative draughts (*Form* 99.), deobstruent liniments (F. 296. 311.) applied over the hypochondria, the nitro-muriatic solution taken internally and used externally, blisters and other external derivatives, will be useful. Cathartic enemata are also serviceable, especially when the bowels are very sluggish, or when the catamenia are interrupted. Most continental writers reprobate the more active purgatives, and venture only upon mild aperients, as rhubarb, manna, tamarinds, &c. When the disease depends chiefly upon relaxation, or irritation of the digestive mucous surface, this caution is very proper; but when the collatitious viscera are chiefly in fault, or when the catamenia are suppressed, the opinion of Dr. Bateman, given strongly in favour of the practice recommended by Dr. Hamilton, is perfectly just.

181. In hæmatemesis vicarious of menstruation, or of hæmorrhoids, purgatives are required; but they should be suited to the peculiarities of the case. When the amenorrhœa is connected with plethora, local depletions, from the groins or tops of the thighs, should be prescribed, and repeated just before the return of the menstrual period, or of the internal hæmorrhage; but when it is connected with adynamia, and a chlorotic or anæmial state of system, the preparations of iron, with myrrh, aloes, or other substances, which circumstances will suggest, should be employed.—In the aged, debilitated, cachectic, and in those addicted to fermented or spirituous liquors, purgatives should be given with caution, those of the mildest kind, in connection with tonics and restoratives, being selected.

182. When the stools continue black some time after hæmatemesis has ceased, this colour

not having arisen from the use of chalybeates, the exudation of blood from the upper parts of the digestive tube — either from the stomach, in so small a quantity as not to excite vomiting, or from the duodenum, or parts in the vicinity — may be inferred. In this case, purgatives, unless those of an astringent or tonic kind, as *Form.* 99, tamarinds, rhubarb, &c. would be injurious. In some prolonged cases of this kind in which I have been consulted, the spirit of turpentine, either in small and repeated doses, or in a full dose, has been most successful; but the external applications just noticed, and means appropriate to the complications which these cases usually present, should not be neglected.

183. *D.* The *regimen* in hæmatemesis does not differ materially from that already recommended. During the continuance of the discharge, total abstinence should be enjoined; but afterwards, mild, mucilaginous liquids, and farinaceous food in small quantity, may be allowed; and the transition to solid and more nutritious diet carefully and gradually conducted. The drink should be cooling and astringent; and appropriate to the states of the digestive organs, especially the liver and spleen. Those prescribed in the *appendix* (F. 591—595. 915, 916.) will be found very generally appropriate. Subsequently, change of air, regular exercise on horseback, and the use of the deobstruent mineral waters, as those of the Beulah Spa, or of Cheltenham, and the factitious Ems or Carlsbad waters at Brighton, ought to be recommended.

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VII. HÆMORRHAGE FROM THE INTESTINES AND MELÆNA.

— Syn. *Intestinal Hæmorrhage*, *Melæna*, Μελαίνα, Μελαίνα Νοῦσος, Ἰλεὸς, αἱματίτης, Hippocrates; *Morbus Niger*, Auct. Lat. var.; *Fluxus Splenicus*, Gordon; *Dysenteria Splenica*, Ballonius; *Nigræ Dejectiones*, Schenck; *Secessus Niger*, Hoffmann; *Melæna*, Sauvages, Sagar, Good; *Melænorrhagia*, Swediaur; *Schwartze Krankheit*, *Schwartzer Blutfluss*, Germ.; *Maladie Noire*, Fr.; *Melena*, Ital.

Defin. — *The evacuations from the bowels, containing fluid, grumous, or coagulated blood, or presenting a black or pitchy appearance, with or without vomiting of blood.*

184. I have considered melæna in connection with intestinal hæmorrhage, although the blood, colouring the evacuations, proceeds, perhaps, as frequently from parts above, as from those below, the pylorus: it may even come from the mouth, nares, or fauces, or from the respiratory passages, as I have already shown. The melæna of Hippocrates was the *morbus niger* noticed above, or a variety of hæmatemesis (§ 156.); the application of the term melæna chiefly to black-coloured dejections being of modern date, and I believe justly ascribed to Sauvages. I have viewed it according to this acceptation, and connected it with intestinal hæmorrhage, as it always arises either from this source, or from blood which has passed into the intestines from parts above the pylorus. At the same time, the frequent association of melanoid stools with vomiting of blood, in any of the states above described, has been kept in recollection, and considered as a result of the patholo-

gical conditions, causing the sanguineous effusion either in the stomach, or in the small intestines, or even in parts above the former viscus. — Indeed, melæna may occur not only in any of the circumstances in which hæmatemesis has been shown to supervene, but also in some of those connected with the other hæmorrhages already noticed.— This fact is fully demonstrated by observation, and by the writings specified above, as well as those referred to at the end of this article. Melæna may also appear in the course of cachectic maladies, especially scurvy, purpura, jaundice, &c.; or of adynamic or malignant fevers; or of malignant adventitious productions. — In order to arrange the various conditions in which blood is voided from the bowels, unconnected with hæmorrhoids, I shall notice—1st. *Intestinal hæmorrhage,* the stools not exhibiting the melanoid appearance—2d, *Melæna,* in relation to the sources of hæmorrhage, and to its complications.

185. i. *Intestinal Hæmorrhage, the Stools containing fluid or coagulated Blood, or Simple Intestinal Hæmorrhage—Hæmor. Intestinorum—H. Intestinalis*—occurs, 1st, from interrupted or impeded circulation through the liver; 2d, from congestion and loss of the vital tone of the capillaries of the mucous coat of the intestines; 3d, from ulceration of the intestinal tunics; and, 4th, from inflammatory irritation, or its consequences in these tissues. — *A.* Intestinal hæmorrhage, perhaps, most frequently arises from *impeded circulation through the vena porta.* Even when other pathological states seem to produce it, this may be a concurrent cause: hence, all those lesions of the liver that occasion some impediment to the portal circulation, may be connected with it. It has also been seen complicated with enlargement and induration of the pancreas, with engorgement of the spleen, with tumours about the root of the mesentery, and with enlargement of the mesenteric glands. These latter lesions are, however, rather contingently associated with the hæmorrhage, than concerned in the production of it; whereas, those alterations—as induration, atrophy scirrhus, enlargement, and tubercular or other changes of the liver, which impede or obstruct the circulation of the vena porta, are the efficients of the sanguineous effusion: hence the occurrence of intestinal hæmorrhage, not only in the course of these lesions, but occasionally also in connection with ascites or anasarca; or even with hæmatemesis, or after protracted intermittent or remittent fevers. In these cases, the blood is exuded from the intestinal mucous surface, as first inferred by Glisson; and it is either fluid, grumous, or coagulated, and of a venous or very dark hue, as it is changed by the intestinal gases and secretions, or by its remora in the bowels. The appearance of the blood also varies according to the situation in which it is exuded.

186. *B. Impaired vital tone of the intestinal mucous surface* and of the capillaries supplying it, with congestion or engorgement of those vessels, is also a frequent cause of intestinal hæmorrhage. It is owing to this pathological condition, that blood is discharged from the bowels in purpura in the early course of fevers; in scurvy, and in other cachectic maladies. In fevers, however, there is probably more or less active determination to this part of the economy, especially in those cases in which the hæmorrhage occurs early, or in which it proves critical. When it takes place in the course of petechial, putrid, or malignant fevers, it is generally passive, or entirely dependant upon the pathological conditions under consideration. In these cases, the blood discharged is generally fluid and grumous, and is of a venous or dark hue. When it is evacuated in an early stage of continued fever, or is critical, it is sometimes partially coagulated, or coagulates loosely after it is passed.

187. *C. Ulceration of the intestines frequently occasions hæmorrhage.* — The discharges of blood from the bowels in the advanced or latter stages of dysentery, or chronic diarrhœa, and of continued fever, are often owing to this cause, although they may also proceed, in these stages of fever from the pathological states just mentioned (§ 186.). Intestinal ulceration unattended by fever may also give rise, although rarely, to hæmorrhage. Instances have even occurred in which ulceration had gone on to perforation of the intestine, and adhesion of it to an adjoining viscus, the consequent hæmorrhage proceeding from the ulceration in that viscus. M. Rayer met with a case in which the duodenum and transverse colon were perforated and adherent to the liver, the ulceration in this latter organ having divided two branches of the *vena porta,* and occasioned fatal hæmorrhage.

188. *D. Inflammation of the bowels* is rarely attended by hæmorrhage to a great amount, unless it terminate in ulceration. It sometimes, however, gives rise to discharges of blood, especially when the cæcum or colon is affected; or when portions of the intestines are introsuscepted.—It has been supposed by some writers, that *blood may be discharged from the liver along the ducts;* but of this we have no satisfactory proof; and it is certainly by no means probable that this fluid will be passed from the secreting structure of this organ.

189. The *appearance of the blood* effused from ulcerated vessels, depends upon their seat and size, and upon the nature and stage of the antecedent disease. In far advanced cases of fever or dysentery, the blood is generally fluid, or grumous, and dark. When a large venous branch has been ulcerated, and the hæmorrhage has been very copious, large soft coagula, with much sanguineous serum, are generally passed by stool. In the inflammatory states of intestinal hæmorrhage, as in the early stages of acute dysentery, the blood is fluid, mixed with lymph and mucus, and not in very large quantity, unless ulceration has occurred. The blood discharged furnishes no sure indication as to the seat of the effusion. When, however, it is fluid and unmixed with fæcal matters, the lower bowels are probably the seat. The ancients supposed that if the blood passed before the fæcal matters, it proceeded from the lower parts of the bowels; and that, if it was voided after the fæces, it was effused by the upper parts: but this is no sure criterion. When the hæmorrhage is profuse, the blood acts as a cathartic, occasions severe colicky pains, and is often the only substance evacuated. — When it is very dark and grumous, or consists of small coagula, and of a sanious fluid, it has generally either been long retained, or been poured out in the upper portions of the canal. The appearance, however, very much depends upon the states of

the vascular system, and of the blood itself at the time when the hæmorrhage occurred; for, if it take place in the latter stages of adynamic or malignant fevers, the blood evacuated will be fluid or grumous as well as of a dark hue, or otherwise altered.

190. ii. *Melæna in relation to its sources and complications.*—When blood either flows into the stomach from any of the situations noticed above, or exudes from the internal surface of this viscus in so gradual a manner, or so slight a degree, as not to excite vomiting, but passes the pylorus, and when it is exhaled from the internal surface of the duodenum or small intestines, the evacuations often assume *a perfectly black colour, and tar-like consistence.* In hæmatemesis, the stools frequently have this appearance (§ 163.), owing to the passage of a portion of the extravasated blood into the bowels. This colour is manifestly owing to the admixture of the blood with the biliary and intestinal secretions, and to the action of the acid and gaseous matters contained in the digestive canal; although other explanations have been advanced (§ 192, 193.). Indeed, the evacuations often present, in nearly the same states of constitutional or visceral disease, every variety of colour and appearance, from these just described as constituting melæna, to those resulting from the manifest and abundant presence of pure or venous blood. Evacuations, more or less obviously sanguineous, must be referred either to some one of the sources just noticed, or to the passage of blood from the stomach into the intestines. When the blood comes from parts above the pylorus, the stools generally have more or less of the melanoid character, and there frequently is, or has been, hæmatemesis; but when it proceeds from the parts below, the stools vary with the quantity of blood effused, and other circumstances, and are generally as described above.

191. HOFFMANN first, and MORGAGNI afterwards, attributed melæna to the discharge of blood from the over-distended and ruptured venous capillaries of the intestines, caused by obstruction of the portal circulation and of the spleen. Dr. CULLEN considered this to be the usual origin of the disease; but admitted that a true *atrabilis* might be formed, and occasion all the phenomena attending sanguineous melæna. Dr. GOOD comprised, as a species of this malady, that morbid state which has been called green or black jaundice, and which is very different from melæna, and not necessarily connected with it, although the stools often have a dark green or blackish hue, owing to alteration of the bile, probably from torpor of the liver and prolonged retention of this secretion in the biliary passages. (See art. JAUNDICE.)

192. Whilst HOFFMANN and CULLEN attributed the colour of the dejections to the remora and alteration of the blood previous to effusion from the venous capillaries, PORTAL, BICHAT, and others supposed that, in consequence of the impeded or obstructed circulation through the mesenteric and portal veins, the blood was more strongly determined to the extreme arterial capillaries or exhalants of the intestines causing distension of, and effusion from, these capillaries; and that the change in the blood from an arterial to a black hue was produced subsequently to the extravasation by the acids and gases in the digestive canal.—In opposition to these opinions, Dr. AYRE has contended that both melæna and the black variety of hæmatemesis (§ 156.) arise from the passage of blood from the minute ramifications of the *vena porta* in the secreting structure of the liver, consequent upon extreme congestion of these vessels; a very dark blood, instead of bile, passing by the biliary pores into the hepatic ducts, and thence into the duodenum. This hypothesis is, however, not supported by pathological research, and is almost as difficult to refute as to establish. If all cases of melæna were preceded by manifest congestion, and its consequence more or less fulness or enlargement of the liver, the probability of this being the source of melæna would be much stronger than it is; but indications of congestion or of enlargement of this viscus are not uniformly observed.

193. Cases sometimes occur in which a very dark, black, or greenish-black bile is passed, the stools being fluid, or of the consistence of treacle, owing to the circumstance just alluded to, and more fully explained in the article on the GALL-BLADDER, &c. I have met with such instances connected with chronic disorder of the respiratory and digestive functions.—Cases also are rarely seen in which melanotic matter is voided by stool, owing to the breaking down of tumours or adventitious encysted formations, containing this matter, as admitted by Dr. MARCARD and Dr. GOLDIE, or to the exudation of this matter from the follicles, where it may have been secreted, if, indeed, such an occurrence ever takes place.—In order to distinguish between melæna arising from the *effusion of blood*, or from *black bile*, or from *melanosis*, the stools should be diluted with water, or with a weak solution of soda, when blood will become apparent if the black colour of the evacuations have depended upon this cause.

194. SAUVAGES and PORTAL have distinguished as many *varieties of melæna* as there are circumstances in which it presents itself. The latter of these pathologists has illustrated an interesting memoir on the subject, by numerous cases; but the varieties adduced by him are deserving of notice, chiefly as indicating the pathological states on which this morbid condition is contingent, and not any modification of this condition itself; for, as he admits, the matters voided are nearly the same in all. The excretion of black or melanoid stools are, according to M. PORTAL, met with as follows:—*a*. In the advanced course of continued fever;—*b*. In connection with periodic fevers;—*c*. After strong mental emotions;—*d*. After the suppression or cessation of hæmorrhoids, of the menses, or of any accustomed discharge;—*e*. From irregular, suppressed, or misplaced gout;—*f*. In the course of scurvy, whether depending upon engorgement of the liver and spleen, or upon alteration of the blood,—*g*. In dropsy, owing to the associated visceral disease, or to the abdominal effusion, or to both. This enumeration is, however, defective, inasmuch as the frequent dependence of melæna,—*h*. Upon disease of the liver, spleen, or pancreas, unconnected with scurvy or with dropsy,—*i*. upon carcinomatous, encephaloid, or fungoid productions in some part of the digestive canal,—and, *k*. upon tumours developed in the mesentery, has been overlooked in it.

195. iii. CAUSES.—The *remote causes* of hæmor-

rhage from the intestines and of melæna, are not materially different from those that occasion *hæmatemesis* (§ 157, 158.). Sedentary occupations; intense or prolonged anxiety, and close application to study or business; full diet and neglect of exercise in the open air; frequent contrarieties; an irritable temper, especially in the melancholic, or sanguineo-melancholic temperament; the intemperate and daily use of spirits or other intoxicating liquors; general debility and cachexia; and the period of life between forty and sixty; are the most common *predisposing* occasions of the disease. Violent mental emotions, particularly fits of anger; great excess in eating or drinking; irritating or drastic purgatives, and acrid poisons; the suppression of sanguineous evacuations or accustomed discharges; the visceral and constitutional maladies just mentioned; and the causes generally productive of hæmorrhage; are the common *exciting* causes of intestinal hæmorrhage.

196. iv. The Symptoms connected with melæna and discharges of blood from the bowels have been partially adverted to (§ 189.). There have commonly been disorder of the digestive canal, as loss of appetite, nausea, or occasional vomiting, and indications of visceral disease, for a considerable time before the attack. A sallow, dusky, waxy, or leaden hue of the countenance; a foul, loaded, dark, or otherwise morbid state of tongue, and tainted breath; a soft or spongy state of gums; fulness, tension, or griping pains of the abdomen, or fulness or enlargement in the hypochondria; oppression or anxiety referred to the præcordia or epigastrium; great debility, faintness, sense of sinking, or syncope; flatulence or nausea; and a tensive or dull pain in one or other of the upper abdominal regions; sometimes vomiting of blood; vertigo and coldness of the extremities; tormina, or colicky pains in the abdomen; and a weak, soft, or open sharp or bounding pulse; usually precede and usher in the discharges of blood by stool, or tar-like evacuations. In some instances, the motions are fœtid or extremely offensive; and in all the exhaustion is great.—In a few cases, the quantity of blood passed from the bowels has been small; yet a fatal termination has occurred, preceded by tormina, and by fulness or tension of the abdomen. In these, the hæmorrhage has been concealed, the bowels being found upon dissection filled by semifluid or coagulated dark blood.

197. v. The Diagnosis of intestinal hæmorrhage and melæna is often difficult; *first*, as respects the seat of effusion; and *secondly*, as regards the resemblance to other affections, particularly biliary disease and hæmorrhoids.—*a*. As to the source of hæmorrhage, the practitioner will be guided in forming his opinion by the circumstances already stated. He will take into consideration the probability of the blood having been poured out from parts above the diaphragm or pylorus, and the existing indications of such visceral disease as usually give rise to sanguineous effusion from the digestive canal.—*a*. If the colour of the stools be caused by black or morbid bile, dilution with water will impart to them a yellowish, greenish, or greenish-yellow hue. If it proceed from the matter of melanosis, dilution will give them neither a bilious nor a sanguineous tint. When the melanoid appearance depends upon blood, the stools are generally offensive, and the sanguineous hue becomes very apparent upon dilution.—*b*. Intestinal hæmorrhage is often mistaken for internal hæmorrhoids; but it is readily distinguished from the latter, by the history of the case; by the tormina and spasmodic pains ushering in the attack; by the action of the bowels being unusual as to the time, and by the attendant sensations and symptoms; by the faintness and exhaustion attending it; by the existing evidence of visceral or constitutional disease; and by the imminent danger in which the patient is manifestly placed. Whereas *hæmorrhoids* are accompanied by the usual tumours, or by prolapsus of the inner coats of the rectum at stool, along with the tumours; and are generally followed by relief of most of the uneasy symptoms, the hæmorrhage occurring chiefly when the patient is passing his usual evacuation, which is commonly more or less fæcal, or unmixed with the blood which is discharged.

198. The *appearances on dissection* are nearly the same as are seen in fatal cases of *hæmatemesis* (§ 165.). The liver and spleen usually present structural change, and occasionally also the mesenteric glands, the pylorus, and pancreas. Congestion, dark-red, brownish, or purplish patches, ulcerations, excoriations, &c. of the digestive mucous membrane, are often observed, especially when the hæmorrhage occurs in an advanced stage of Fever (§ 51.), in scurvy, or in purpura. In these, the mesenteric and portal veins are very generally loaded with dark, fluid, or thick blood. In some instances, however, the digestive canal is not materially altered; and, in others, it is unusually pale and bloodless. The blood itself is often manifestly changed, the hæmorrhage, as well as the melanoid state of the stools, depending partly upon this circumstance, and partly upon the lost tone of the digestive mucous surface and capillaries. This change obviously obtains in the diseases just mentioned, and in *scorbutic dysentery*, in which discharges of dark blood frequently take place from both the small and large intestines.

199. vi. Prognosis. — Intestinal hæmorrhage and melæna are generally attended by danger; but much depends upon the pathological states of which they are consequences, upon the amount of the discharge, and the consequent exhaustion. When the effusion takes place early in fever or dysentery, is moderate, or is likely to prove critical, a more favourable opinion may be given; but with some reservation nevertheless. When sanguineous, or black stools, are consequent upon hæmatemesis, or upon hæmorrhage from parts above the diaphragm or pylorus, the prognosis will have strict reference to the related circumstances, and especially to the parts from which the blood appears to have directly proceeded; and will be either favourable or unfavourable accordingly; but, unless when the blood has come from the lungs, in the manner noticed above (§ 99.), or in some alarming states of hæmatemesis, or when there are very obvious visceral disease, and great exhaustion, the danger is much less than in true intestinal hæmorrhage and melæna.

200. vii. Treatment. — The stools ought to be attentively examined, in those diseases especially in which intestinal hæmorrhage and melæna are most likely to occur, and still more particularly

whenever faintness or exhaustion after a motion is complained of. For want of this precaution, hæmorrhage from the bowels has been often overlooked, and even fatal syncope has supervened, soon after the patient has been allowed to get upon the night-chair. In most circumstances of disease, in which this form of hæmorrhage is apt to occur, a bed-pan ought to be used, and the sitting or erect posture should not be assumed, until it is allowed by the physician.

201. *A.* The ancients supposed that blood effused in the intestines soon becomes putrescent; and they, therefore, prescribed purgatives to carry it off, and to prevent its injurious effects upon the system. This view of the matter is not without truth; but purgatives ought to be employed with caution, as they are apt to increase the hæmorrhagic state of the bowels, if they be of an irritating or relaxing kind. *Rhubarb*, with *ipecacuanha* and the *hydrargyrum cum cretâ*, and spirits of *turpentine* with *castor oil*, are the most safe, appropriate, and efficient purgatives in this disease; but they will often require to be assisted by mucilaginous enemata, or by injections containing these oils. When the liver is much affected, occasional doses of *calomel* may be given with rhubarb, or with opium or some other narcotic, as circumstances may suggest. The spirit of turpentine was prescribed first by Dr. Adair for this form of hæmorrhage, and afterwards by Dr. Brooke in the same year that it was employed by myself in a different quarter of the globe. I have since always resorted to it, and in some very hopeless cases. In a very severe case of melæna, which I saw in 1823, with Mr. Churchill, this medicine was successfully administered after the most powerful astringents had failed. It has likewise been recommended by Dr. W. Nicholl and Dr. Elliotson. It exerts either an astringent, or a purgative effect chiefly, or both, according to the dose and the mode of exhibiting it (§ 176.). It is also very beneficially applied over the abdomen, in the form of liniment, or of warm epithem or fomentation.

202. The other means of cure should entirely depend upon the related pathological states, and upon the nature of the malady, on which this is contingent. If it occur in the course of *putro-adynamic* fever (§ 491.), the means there advised should be employed; if in the progress of *scurvy* or *purpura*, the remedies directed for these diseases, in addition to those now suggested, ought to be prescribed. If intestinal hæmorrhage depend upon structural change of the liver or spleen, the treatment is not materially different from that advised for *hæmatemesis*, in similar circumstances; but when the discharge is profuse, astringents must, in the first instance, be decidedly employed. Of these, the oleum terebinthinæ; the acetate of lead with opium, or with acetic acid and morphine; the gallic, citric, or other vegetable acids; the mineral acids and the metallic salts; the chlorides, especially the chloride of lime; kreosote, and the most powerful vegetable astringents should be preferred. — When nervous symptoms are present, camphor may be conjoined with either of these, or with opium; and, when the crasis of the blood, as well as the vital cohesion of the tissues, are manifestly impaired, the chlorides, or the muriate of ammonia, or the nitrate or the chlorate of potash, &c., may be given with such of the astringents as are congruous with them.

203. *B.* The *diet* and *regimen* should be even more rigidly attended to than in hæmatemesis. The former ought to consist chiefly of farinaceous and mucilaginous substances. Fruits and slops are generally prejudicial. Vermicelli, or rice boiled to a pulp, and moistened with beef tea, or veal broth, is generally suitable. Perfect quiet of body and mind, and the recumbent position, ought to be maintained. Wine is sometimes necessary, especially in the circumstances requiring the use of opium. Lime-water, alum-whey, lemonade, imperial, or any of the beverages prescribed in the Appendix (F. 588. *et seq.*), may be employed as the patient's drink. When blood has entirely disappeared from the stools, attention ought to be carefully directed to the excretions and the digestive functions, and the strength restored by mild and light nourishment, the quantity of which should be gradually increased to a very moderate amount. The causes, and pathological states on which this affection depends, ought to receive attention, as the removal or mitigation of these is the most sure means of preventing a recurrence of the attack. When convalescence is not retarded by disease of the liver, then wine with seltzer-water, the preparations of bark, and various tonic astringents may be allowed; but the bowels ought at the same time to be duly regulated. (See also *the Treatment of Hæmatemesis* (§ 174.)

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VIII. Hæmorrhage from the Urinary Organs.—Syn. *Hæmaturia* (from αἷμα, blood, and οὐρέω, to urinate.), Auct. var; *Sanguis in Urina*, Celsus; *Mictus Cruentus*, Sydenham, Hoffmann, and Juncker; *Mictus Sanguineus*, *Hæmorrhagia ex Viis Urinariis*, *Hæmorrhœa Vium Urinariarum*, Swediaur; *Blutharnen*, Germ.; *Pisement de Sang*, *Hématurie*, Fr.; *Orina de Sangue*, *Ematuria*, Ital.; *Bloody Urine*, *Hæmorrhage from the urinary passages.*

Defin. — *The urine, containing or consisting of a fluid, grumous, or partially coagulated blood, the colour varying from red to brown or black,* *sometimes with small fibrinous coagula, the patient generally complaining of uneasy sensations in the region of the kidneys or bladder.*

204. i. The Causes of hæmaturia are—*external injuries* on the loins, hypogastrium or perinæum; falls, or concussions of the trunk; prolonged or severe exercise on horseback; riding in carriages over a rough or broken pavement; violent muscular exertions; — *Internal irritants*, as calculi formed in the kidneys or bladder, and acrid substances taken into the stomach, absorbed into the blood, and carried to the kidneys, as turpentine, cantharides, savine, and various other medicines; —and whatever inflames, or causes congestion of the urinary organs, as the application of cold, the suppression of accustomed discharges, &c. — Hæmaturia may also be produced by the concurrent influence of plethora, venereal excesses, violent fits of passion, &c.; but the most common causes are organic changes implicating the kidneys or bladder; general cachexia, as scurvy and purpura; malignant and exanthematous fevers; and even still more common are calculous formations and the other internal irritants specified above.—This disease is most frequent in males, in persons advanced in life and in the aged; in plethoric habits and sanguineous or irritable temperaments; in the scrofulous and calculous diathesis; in those who pass an indolent and luxurious life, and who are addicted to venereal indulgences, and to the intemperate use of intoxicating liquors.

205. *a. Idiopathic hæmaturia* is extremely rare. Cullen states that he never met with it. J. P. Frank rarely saw it. Unless when caused by cantharides or turpentine, it is certainly very seldom observed; and even when thus induced the hæmorrhage is generally scanty, and the consequence of inflammatory irritation. Indeed, hæmaturia is often merely a symptom of inflammation of either the kidneys or urinary bladder, the quantity of blood effused being small. — *b. Supplemental hæmaturia*, or that which is vicarious of the catamenia, or of hæmorrhoids, is equally rare, although its occurrence has been much insisted upon by foreign writers; and it is extremely probable that organic lesion is more or less concerned in the production even of this variety. Choppart, however, mentions an instance of hæmaturia consequent upon irregular menstruation, in which the urinary organs presented no change after death.— *c. Critical hæmaturia* is seldom observed, although Forestus, Ettmüller, Amatus Lusitanus, Marcellus Donatus, Zacutus Lusitanus, Hoffmann, Juncker, Choppart, Latour, &c., insist on its importance during inflammatory fevers, and in plethoric persons. They also consider that, of all critical hæmorrhages, it should be the least interfered with. When hæmaturia is actually critical, it seems to depend upon a similar state of local action and of vascular fulness, general or local, to that which obtains in the more idiopathic and vicarious states of the disease. — It is chiefly, therefore, as a *symptom* of previous disease, local or constitutional, or even of both, but especially of urinary calculi, that hæmaturia is met with in practice.

206. ii. The Description of hæmaturia comprises — 1st. The appearances of the urine and of the blood contained in it; 2d. The symptoms attending this morbid state of urinary excretion, and their relation to the seat of hæmorrhage; and, 3d. The pathological states of which hæmaturia is the consequence.— *A.* The *urine* may contain much or little blood; or the fluid evacuated from the bladder may be almost entirely blood. Its colour may be either red, or brownish red, or nearly black or inky. Sometimes the urine is passed *guttatim* with pain and scalding; and with a constant or frequent recurrence of the desire to empty the bladder, although but little or even no urine is contained in it. At others, the blood and urine are retained in large quantity, efforts at evacuation being ineffectual, owing to coagula obstructing the outlet from the bladder or being lodged in the urethra. Even when the obstacle is removed by a sound or catheter, the urine often presents a bloody, sanguineous, or chocolate appearance for several days, although the hæmorrhage may have ceased, and is sometimes extremely offensive from the decomposition of the clots retained in the bladder, or from the action of the urine upon them. Occasionally this fluid is grumous, very dark, or even black, or contains a number of small brown coagula. In some cases, fibrinous substances of various forms and sizes are evacuated, consisting of the fibrine of the effused blood, moulded or changed by the parts through which they have passed. In others, a stringy or gelatinous substance, with dark coagula, or black grumous matter, is observed in the urine; and occasionally mucous, muco-puriform, or gravelly matters are also found.

207. *B.* The *symptoms* of hæmaturia vary with the seat of hæmorrhage. (*a*). When the *kidneys* are the parts chiefly affected, the attack is usually preceded or attended by chills or rigors; by coldness of the extremities, and particularly of the hands; by deep-seated pain, or a sense of weight, or of tension, or of heat in the loins; by general lassitude; and often by anxiety, or colicky pains in the abdomen; by frequent desire to pass the urine; sometimes by numbness in one or both thighs, and pain in the course of the ureters, or by nausea or retchings. If cantharides or savine have been taken, a burning heat is felt in the urinary passages, with priapism, scalding, and pain on discharging the urine, &c. — (*b*). When the *bladder* is the seat of hæmorrhage, a frequent desire, or great difficulty, to excrete the urine; tenesmus, or pain or heat about the anus; a sense of tension or of warmth, with itching above or behind the pubis, or of dragging in this situation; pain or aching in the perineum, frequently with febrile symptoms or nausea, and constipation of the bowels, are complained of. The severity of the local symptoms, as well as the state of constitutional disorder, vary extremely, according to the grades of vital power and of sthenic or asthenic vascular action, and to the organic changes or nature of the local irritation of which the hæmorrhage is a consequence.

208. The above symptoms, especially when they precede the attack, indicate inflammatory irritation or active congestion of the urinary organs. But sometimes the hæmorrhage takes place suddenly, and in great abundance, without any precursory sign. In some cases, also, the symptoms are very obscure. In most of these, however, it will be found that the blood comes from the kidneys, and that its effusion is caused by calculi in these organs. Even when the blood is discharged

from the kidneys, the symptoms may be most severe in the region of the bladder, owing to the irritation and interrupted excretion of the effused blood, or even independently of these circumstances. Indeed the symptoms have not infrequently been referred to the sound or least affected organ, whether the kidneys or bladder. More commonly, however, they indicate the seat of hæmorrhage with much precision, when duly investigated.— Dr. PROUT very justly remarks, that, when the blood is equally diffused through the urine, it generally proceeds from the *kidneys;* and that when it mostly comes away in greater or less quantity at the termination only of the urinary discharge, the urine having previously flowed off nearly pure, it is effused from the *bladder*. In the former case, also, coagulated fibrine in the shape of worms, moulded in the ureter, and subsequently washed out by the urine, are not infrequently met with. When these appear, the diagnosis is unequivocal, especially when they are consequent upon the symptoms above referred to the kidneys, or upon other evidence of the existence of calculi in these organs. On the contrary, when there are symptoms of stone in the bladder, or of other disease of this viscus or of the prostate gland, indications of renal disorder not being present, the bladder may be considered the source of hæmorrhage; and this inference may be likewise drawn, if severe pain above or behind the pubis be complained of; if the bladder become suddenly distended; if the passage of urine be interrupted or entirely obstructed, and if other signs of coagula in the bladder be present, although the external discharge may be small.— When the blood passes, *guttatim*, without urine, it manifestly comes from the *urethra*. It may, however, proceed from the upper parts of the urethra, and flow back into the bladder, and be voided with the urine. Rigors or horripilations not infrequently attend hæmorrhage from this, as well as from other parts of the urinary passages.

209. *Hæmorrhage into the bladder*, from either the kidneys or ureters, or the upper part of the urethra, but more especially from the *parietes of the bladder itself*, may be followed by *coagulation of the blood* in this viscus. This is not unlikely to take place, if the effusion be sudden and copious; and whenever it does, the patient experiences great suffering. When the coagulum is large, it often causes retention of urine; and when it is small, it sometimes becomes the nucleus of calculous formations. The principal *indications of the existence of coagula* in the bladder are pain, distention, and weight, with tenderness or tension above and behind the pubis, with a sense of dragging in this situation, and of aching in the perineum, preceded or attended by the excretion of a small quantity of pure or recently effused blood by the urethra, and frequent desire to pass the urine. When this secretion is retained, distension of the bladder so as to occasion a tumour above the pubis, with tenderness and tension of the hypogastrium and other distressing symptoms are also present. If the urine present, after a scanty discharge of recently effused blood, and more or less of the above symptoms, a brown or chocolate appearance, or deposits a heavy dark sediment, and if frequent efforts to urinate continue, the evidence of coagula in the bladder is still stronger (§ 208.).

210. *C. Duration, &c.*— Hæmaturia may continue a few minutes only, or many hours, or even days. It may *remit* or *intermit*, or recur at short or very distant intervals. It may be even *periodic*, the attack returning more or less frequently. Periodic hæmaturia is not uncommon in miasmatous climates, and it is, although rarely, even seen in this country amongst those who have been exposed to malaria, or have resided long in warm climates, or suffered from periodic fevers. In a case of this kind detailed by Dr. ELLIOTSON, hæmaturia accompanied the cold fit of ague, and was cured, along with the ague, by the sulphate of quinine. Hæmaturia may be also periodic when it is vicarious of the catamenia or of hæmorrhoids. When it depends upon calculi in the urinary organs, its recurrence may be expected until the cause is removed; when it proceeds from malignant or other organic disease of these parts, it is most commonly persistent, recurring, or severe, or even fatal in its consequences.

211. *D. The Pathological states of which hæmaturia is generally a consequence* have been already noticed, but some of them require more particular mention. — *a*. When the hæmorrhage is consequent upon *inflammatory irritation*, the symptoms referrible to either the kidneys or bladder are well marked, and more or less symptomatic or irritative fever is often present. Fibrinous substances are also generally found in the urine, and the discharge of blood is seldom considerable, and never excessive. Hæmaturia, from inflammatory action of the inner coats of the bladder, is stated by M. RENOULT to have been very prevalent among the French troops in Egypt. It was characterised by pain in the region of this viscus, extending to the glans penis, with frequent and urgent desire to pass urine, the last drops often consisting of pure blood, and their discharge being attended by very acute pain.— *b*. Very nearly the same phenomena are observed when the complaint depends upon the irritation of *calculi in the kidneys or bladder*. When these exist in the latter viscus, mucous or muco-puriform matter, or a gelatinous lymph, is sometimes found, along with more or less blood, in the urine. — *c*. The irritation of a *calculus in the ureter* may occasion hæmaturia; but the symptoms, as respects either the appearances of the urine, or the seat of uneasiness, may not be different from those already mentioned. In some cases, the pain felt in the situation or course of the ureter; the sense of weight, uneasiness or pain in the lumbar region of the same side; and the numbness or cramps of the thigh or leg of that side, will indicate the source of disorder.— *d*. The hæmaturia which occurs in the course of typhoid or putro-adynamic fevers, of scurvy, and of purpura generally arises from *relaxation of the extreme vessels* of the kidneys, and of the urinary mucous surfaces, in connection *with alteration of the blood itself*. In these, the blood is sometimes effused in considerable quantity; but it is never coagulated, although it is occasionally grumous. It is more intimately mixed with the urine than in other circumstances; the excreted fluid being generally dark, and either offensive or soon becoming so. — *e*. Hæmaturia may also arise from *malignant disease* of the *kidneys, bladder*, or *prostate gland*, especially *fungoid* or *encephaloid*

productions in these organs. In some cases arising from this cause, the hæmorrhage has been excessive, the urinary bladder being distended by fluid and coagulated blood, especially when the effusion has taken place from this viscus, or from the prostate gland. An interesting instance of hæmorrhage into the bladder from fungoid tumours connected with the prostate, where it was necessary to perform the high operation in order to remove large and firm coagula that had formed, is recorded by Mr. Copland Hutchison (*Lond. Med. Repos.* vol. xxii. p. 128) — In some cases of malignant disease of the urinary organs, the colouring parts of the blood appear as a reddish sediment in the urine. — *f. Softening of the kidneys, or the internal tunics of the bladder* may be followed by hæmaturia, without being suspected during the life of the patient; but these lesions are very rare. — *g. Ulceration of the inner coats of the bladder* very rarely occurs, unless as a consequence of *simple cystitis*, or of cystitis associated with calculi in this viscus; or without very manifest symptoms of these diseases. In these cases, the hæmaturia is preceded by such symptoms for a longer or shorter period, and the urine has been loaded by mucous or muco-puriform matter. — *h. A varicose state of the veins*, particularly about the neck of the bladder, has been noticed by several writers as a cause of hæmaturia (*Hæmorrhoides vesicæ*, auct. var.), and by some in connection with the gouty diathesis; but this change is very seldom observed. — *i. Other organic lesions* of the kidneys have been mentioned as causes of hæmaturia; but they can be merely suspected during life, unless they be attended by, or consist of, tumours of the organ, and give rise to pain in the loins and numbness of the thigh of the same side, with the appearances of the urine already noticed (§ 208.); and even then, their nature will seldom be fully ascertained.

212. iii. Diagnosis. The urine may present appearances very closely resembling hæmaturia and yet be perfectly free from blood. The internal use of various vegetable substances, especially the prickly pear (*Cactus opuntia*), beet-root, madder, sorrel, logwood, &c., will give a *red colour* to the urine, that will be distinguished with great difficulty from that produced by blood. The reddish pink hue of the urine in some inflammatory diseases, will hardly be confounded with hæmaturia. — The dark, *black, or inky state of the urine*, noticed by several writers, may arise either from the presence of blood, or from the principal elements of bile being excreted by the kidneys with the urine, whilst the liver is obstructed or incapable of performing its functions, as in jaundice. Cases in which *black urine* has been voided, are recorded by Rhodius, Schenck, Saillens, Bonet, Cowper, Riedlin, Bartholin, Lommius, Stoll, Nicolai, Marcet, E. Thompson and myself. Galeazzi met with it complicated with hæmatemesis. Bonet, after recording a case in which the urine had the appearance of ink, states, that he has observed this in hypochondriasis, where it has occasionally proved critical. In a case treated by me fifteen years ago, a perfectly black sediment was deposited after the urine had stood some time. This condition of the urine may be produced either in the way just stated, or in the manner I have explained when detailing the case just alluded to (*Lond. Med. Repos.* vol. xviii. p. 161.) — by supposing the arterial capillaries and secerning apparatus of the kidneys to be relaxed to a degree sufficient to allow red globules of the blood to escape with the excreted urine, the black colour arising from the action of an acid, or of the saline ingredients of the urine on these globules.

213. When blood is present in the urine in any considerable quantity, a portion of it sinks to the bottom of the vessel, and the transparency of the secretion is disturbed. The reddish pink urine without blood is generally clear. A mixture of urine and blood tinges a piece of white rag dipped into it of a red colour. Dr. Watson observes that, upon boiling urine containing blood, a brown coagulum will be formed, and that the fluid part will regain the natural colour of urine. When the black hue depends upon the presence of bile, it passes to a yellowish or greenish tint upon dilution with water; if it proceeds from blood, a reddish colour becomes apparent, especially if a little subcarbonate of soda be added.

214. iv. Prognosis. — The prognosis must depend chiefly upon the pathological states producing the hæmaturia. If these consist principally of inflammatory action or irritation, or of active congestion, a severe, although not necessarily a dangerous, disease is indicated. If there be evidence of calculi in the kidneys or bladder, a nearly similar opinion may be formed, but much will depend upon the circumstances of the case, and the states of associated disorder, particularly of these organs. If hæmaturia occur in aged persons and broken down constitutions, or if there be reason to infer the existence of malignant or serious organic change in any part of the urinary passages, the prognosis must be very unfavourable. The amount of hæmorrhage is in itself rarely fatal, although the retention of coagula in the bladder is always dangerous, and often fatal, from the consequences which result, particularly as respects the excretion of urine. When hæmaturia appears in the course of adynamic, continued or exanthematic fevers, or in purpura, &c. an unfavourable opinion of the result should be entertained.

215. v. Treatment. — *a.* When bloody urine proceeds from inflammatory irritation or active congestion, or is supplemental of some other sanguineous discharge, and especially when it is attended by severe pain or symptomatic fever, or increased vascular action, *bloodletting*, and particularly cupping on the loins, or perineum, according to the seat of the chief affection, should be practised. In these, as well as in other circumstances, demulcent diluents, and oleaginous or mild aperients, are more or less beneficial. When acrid substances have caused the complaint, these are especially required; and the almond emulsion, the gums, the decoction of althæa, the infusion of linseed, &c. may be abundantly exhibited, either alone or with small doses of camphor, or with paregoric elixir. When the hæmorrhage is induced by calculi, local depletions, and demulcents, conjoined with the opiates or other anodynes, or these latter, either with the alkaline subcarbonates, or with diluted muriatic acid, according to the state of the urine, the warm bath, and emollient enemata, will generally be of service.

216. *b.* When hæmaturia presents a passive character — when it is attended by great debility or vascular asthenia, or supervenes in the course of

the maladies already mentioned, camphor should be given in considerable doses, with small quantities of opium or acetate of morphia. In such cases, also, the the tincture of the muriate of iron; or the balsams or terebinthinates, particularly the balsam of Peru, copaiba, the Canadian balsam; or the spirits of turpentine in small doses; or the infusion of uva ursi, or of the diosma crenata (F. 231.) may be employed, and conjoined with opiates or other anodynes according to circumstances. Frank advises cold clysters with vinegar, and tonic astringents internally. Dr. Prout found an obstinate case of profuse hæmaturia yield at last to a combination of colchicum with uva ursi. Where sabulous or calculous formations are concerned in the production of the hæmorrhage, or when the hæmaturia occurs in the gouty diathesis, this combination, either alone or with the alkaline subcarbonates, seems very appropriate. When the hæmorrhage is so very profuse as to require to be immediately arrested, dry cupping on the loins, the warm bath, or warm pediluvia, spirits of turpentine, given internally and administered in enemata, the superacetate of lead with opium, kréosote, and the other active astringents already mentioned (§ 40. 178.) are the most to be depended upon.

217. *c.* If *coagula* form in the bladder, the serious consequences they usually induce should be prevented as much as possible by breaking them down by means of a catheter; and by injections of tepid water, or other emollient fluids, containing a small quantity of the subcarbonate of soda, or of potash. This practice has been advised by Desault, J. P. Frank, Home, Larrey, Howship, and others; and should not be delayed, or partially or negligently adopted.

218. *d.* There have been *some other means* recommended by writers on the disease, but few of them are deserving of notice. Cælius Aurelianus advised bloodletting, the injection of astringent fluids into the bladder, and the application of cold epithems to the pubis; but considered diuretics to be injurious. Sydenham recommended depletion, and astringents with narcotics; Buchave and Loeffler, frequent doses of ipecacuanha; Gooch large doses of opium; Moyle, Schoenfeld and others, the terebinthinates; Bishop, the decoction of the leaves of the Persian almond; and J. P. Faber, the application of lead or of its preparations over the region of the kidneys.

219. *e.* The *regimen* during and after hæmaturia should be directed in conformity with the seat of the disease, and with the principles already developed. The *diet* should be chiefly farinaceous and mucilaginous; and the beverages emollient and slightly astringent. The waters of Bath, or those of Ems and Carlsbad, or of Seltzers and Geilnau, or the factitious waters prepared at at Brighton, may be tried. When the bowels require assistance, oleaginous purgatives, especially castor and olive oil, are upon the whole the most appropriate, and may be freely administered in enemata. The patient should avoid riding on horseback or in a carriage; but, if the latter cannot be dispensed with, an air-cushion should be used.

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IX. Hæmorrhage from the Uterus. — Syn, *Sanguinis Stillicidium ab Utero*, Ballonius. *Hæmorrhagia Uterina*, Juncker, Good. *Hæm. Uteri*, Hoffmann. *Menorrhagia*, Sauvages, Vogel, Cullen, &c. *Fluor Uterini Sanguinis*, Boerhaave. *Hysterorrhagia sanguinea*, Swediaur. *Metrorrhagia*, Sagar, Ploucquet, J. P. Frank. *Metro-hæmorrhagia*, Auctor. *Blutgang*, *Mutterblutfluss*, *Gebärmutterblutfluss*, Germ. *Perte de Sang des Femmes*, *Perte Rouge*, *Perte Uterine*, Fr. *Perdita di Sangue*, Ital. *Uterine Hæmorrhage, Flooding.*

220. Defin. — *Discharge of blood from the vessels of the Uterus, independent of the menstrual evacuation.*

221. From this, definition it will appear, that *Menorrhagia*, or excessive menstruation, should not be confounded with *Metro-hæmorrhagia*, or uterine hæmorrhage. But it should not be overlooked that the former often passes into the latter. Menorrhagia is treated of in the *Article* Menstruation: hæmorrhage from the uterus only, legitimately falls under consideration at this place. *Metrorrhagia* (from μήτρα, the womb, and ῥήγνυμαι, I break forth) has been very generally employed to denote this disease; but it is evident that αἷμα should be interposed, in order to convey the idea attached to this term, and that the name, *Metro-hæmorrhagia* should be preferred. —

The division of this subject, adopted by M. DUGES and some others, although considered unnecessary by M. DESORMEAUX, may be here followed with advantage. I shall, therefore, consider uterine hæmorrhage as it occurs — 1st. Before puberty; 2d. During nubility, or before the cessation of the menses: — 3d. At the critical period of life, and during old age; and, 4th. In connection with the puerperal states, or during pregnancy, and after delivery.

222. i. Hæmorrhage may take place from the uterus, or in a slight degree from the vulva, at any period *previously to puberty;* but this very rarely occurs, unless as a consequence of masturbation, or of premature sexual connection, or of genital excitement. The destructive vice, masturbation, exists much more frequently amongst young females, and is acquired at an earlier age than is generally supposed even by medical men; children of the age even of two or three years, sometimes acquiring it from nurse-maids, or from older children. Two or three instances of this have accidentally come to my knowledge. Both at the infirmary for children, and in private practice, cases of hæmorrhage from the female genitals occurring at irregular periods previously to puberty, have come before me; as well as instances of premature menstruation, the discharge recurring after monthly intervals; and, in every case, a strict investigation has led to the inference as to the cause already stated. Precocious menstruation is much more rare, than uterine hæmorrhage before puberty; the latter, may be distinguished from the former, by the attendant injury to the general health, and loss of the healthy look, and complexion: whereas, the former is accompanied by a more rapid growth of the frame, and by other signs of puberty, as the developement of the mammæ, &c.

223. ii. From the 12th to the 16th year, in our climate, the female sexual organs are developed so far as to give rise to the menstrual discharge. But the occurrence of this discharge, at or for some time after the earlier of these years, is not an indication of these organs being capable of performing all their functions, inasmuch as impregnation is rarely effected before fourteen years of age. *Metro-hæmorrhagia, occurring after puberty,* independently of the puerperal states, or menorrhagia proceeding so far as to amount to a true hæmorrhage, is liable to recurrence, at irregular or regular periods. When the hæmorrhage is slight, and returns at the monthly periods, the observations offered when treating of *excessive* MENSTRUATION are altogether applicable. But when it is very large, or of frequent, or of habitual recurrence, it is most exhausting and injurious to the system, although it may be entirely independent of any structural lesion. A female may experience only one attack, arising from excessive determination of blood to the uterus, caused by various exciting causes: and, even when the attacks recur, they will be much influenced by diet and regimen. Whenever they return, whether at monthly, at irregular, or at short intervals, or whether the discharge be continued or remittent, especially if the female have been or is married, or has had children, some morbid structure in the uterus should be dreaded, and a careful examination made *per vaginam.* Uterine hæmorrhage at this epoch, unconnected with impregnation and the puerperal states is, either, 1st. *Sthenic* or *active* — depending upon determination of blood to, or upon inflammatory irritation of, the uterus; or, 2d. *Asthenic* or *passive,* arising from impaired tone of the uterine vessels and parietes; or, 3d. *Symptomatic* of organic lesion. But before the phenomena ushering in or attending these states of the disease are described, the causes which induce them may be detailed.

224. *A. Causes.* — *a.* The *predisposing causes* which are more especially concerned in the production of this form of uterine hæmorrhage, are the epochs at which the menses first appear and at which they altogether cease; the menstrual periods themselves; general or local plethora; excessive sensibility of the uterus, arising either from original conformation, or from inordinate sexual excitement, or masturbation; frequent or difficult child-bearing, or abortions, especially if they have succeeded each other rapidly; constriction of the abdomen by tight corsets (MAURICEAU, RANOË); too much warmth applied to the lower parts of the trunk and thighs; very hot seasons; the habitual use of exciting liquors, of rich and high-seasoned dishes; and a frequent recourse to warm baths. These predispose chiefly to the more *active* states of uterine hæmorrhage, but the following favour the occurrence of the more *passive* forms; — especially weakness of constitution, general debility, and cachexia; the lymphatic temperament; imperfect or unwholesome nourishment; chronic or excessive discharges, particularly prolonged lactation; the depressing passions, as grief, sadness, anxiety, &c.; the abuse of relaxing beverages, &c.

225. *b.* The *exciting causes* are, stimulation of the vascular system generally, or of the uterine organs in particular, by the use of hot baths, of intoxicating liquors, of acrid purgatives, or of emmenagogues, and by excessive sexual indulgence; riding on horseback, or in an uneasy carriage; prolonged dancing; running, or walking too far; lifting heavy weights, and physical exertions of any kind; shocks or concussions of the trunk; falls on the thighs or hips; excitation or irritation of the sexual organs, by injections, pessaries, or suppositories; the more violent mental emotions, as anger, fright, &c. SENNERT refers to a case in which it was induced by a stimulating pessary; and obstruction or retardation of the menses may be the cause of hæmorrhage, independently of any means being used to remove this obstruction, as shown by DESORMEAUX and LOCOCK. It is, also, not unusual for metro-hæmorrhagia to occur within the first fortnight after marriage, especially when this rite has been performed shortly before the period of female indisposition. It has been supposed that sexual congress during this period is apt to induce an attack of this disease. Certain causes, also, may occasion it, by affecting related organs, and thereby acting sympathetically upon the uterus. VAN-DEN-BOSCH adduces instances of it having been produced by worms in the intestines. I have seen it favoured, if not excited, by ascarides. — STOLL and FINCKE observed uterine hæmorrhage unusually prevalent during the bilious inflammatory fever of 1778. GENDRON, CONRADI, STRACK, and HÖPFNER, remarked it occasionally to attend gastric and bilious diseases; and ZIE-

been conceived that it is not infrequently induced by irritating matters lodged in the bowels. The irritation of the mammæ during suckling causes it, in some females. A passive and severe form of the disease has been observed to attend upon epidemics of an adynamic or malignant character; and upon scurvy, and some other cachectic maladies.

226. But however influential and numerous may be the occasional causes of metro-hæmorrhagia, they do not so frequently produce it as *morbid formations in the uterus*, particularly fibrous and other tumours seated in the parietes of the organ, or under the internal lining, polypous productions, hydatids, moles, ulcerations, carcinoma, &c. It may also attend inversion, prolapsus, or other displacements of the womb; or may accompany inflammatory congestion of this viscus, or chronic metritis; and it may even prove a critical evacuation in these affections.

227. *B. Symptoms and Progress.* — These vary with the causes of the hæmorrhage. If the occasional cause be violent, it sometimes follows instantly upon the action of such cause; but, more commonly, a certain interval is observed, during which indications of congestion of the uterine vessels may be observed. In some such cases the attack is so severe as to place the patient's life in jeopardy, particularly if it have occurred during the menstrual period. This form, which may be called accidental uterine hæmorrhage, does not ordinarily occur; but that, on the contrary, which follows the operation of the predisposing causes, is slowly established, and often by a successive increase or duration, or by the more frequent return of the menstrual discharge.

228. The precursory symptoms of an attack sometimes consist only of uneasiness, or colicky pains, as on the accession of the menses; but more frequently the discharge is preceded by some of the following signs — by enlargement, tenderness, or pain of the breasts; tension at the hypochondria; a sense of fulness, weight, heat, throbbing, or pain in the hypogastric and inguinal regions; constipation, or tenesmus with occasional abdominal pains; general lassitude, and a frequent, soft or open pulse. To these succeed pallor of the face, coldness of the extremities, horripilations, the *cutis anserina*, and heat or pruritus of the genitals, followed by the sanguineous discharge, which removes most of the foregoing ailments; but, when the loss of blood has become great for her strength, the patient complains of a sense of sinking or weakness at the epigastrium; and when it is excessive, the lips and face are pallid, the pulse fails, and the eyes grow dim; noises are heard in the ears, and deafness supervenes; respiration becomes quick, laborious or irregular; and faintness, full syncope, convulsions, or even death may take place. But the symptoms do not always follow this course. In some cases, the discharge is less rapid or excessive; coagula form in the vagina; and these restrain the hæmorrhage, and are afterwards expelled by voluntary efforts, before the severer symptoms occur. In delicate or nervous females, convulsions or other nervous symptoms may appear early, or before much blood is lost. Violent headach, especially towards the occiput, is a very common attendant, and generally continues long after the hæmorrhage has ceased. If the discharge, without being excessive and rapid, recurs frequently, or is moderate but continued, or merely remits, the patient complains of pain and sinking at the stomach, of extreme langour and exhaustion; the pallor is extreme, the eyes are surrounded by a livid circle; the ankles become œdematous, especially towards night; various nervous symptoms appear, and serous effusions into the shut cavities occasionally occur. Metro-hæmorrhagia may appear at first in a sthenic or acute form, and become passive or asthenic from its continuance or recurrence; the effused blood being frequently thin, pale, or dark. It may continue long, or return often, without giving rise to any severe ailment, or merely to some of the foregoing symptoms in a slight degree. When it occurs at the menstrual period, it is often replaced by a leucorrhæal discharge.

229. *C. Diagnosis.* — The disease is so manifest as to the extent of the sanguineous discharge, and the effects thereby produced upon the system, that its diagnosis is a matter of no difficulty. But it is not so easy to distinguish between the causes which produce it, and the states of the œconomy which are induced by it. Yet this distinction, as M. Desormeaux contends, should be made, as it directs to a judicious method of cure, and it will generally be made without great difficulty if the attention of the practitioner be directed to the subject, and if the various circumstances causing the attack, and the several phenomena attending it, be passed in review. As to uterine hæmorrhages dependent upon organic lesions of the uterus, it may be remarked, that most frequently they are not passive, even when they proceed from ulceration; but that they are generally preceded by circumstances indicating sanguineous congestion, active determination, or an hæmorrhagic effort.

230. iii. Uterine hæmorrhage, *about the period of the cessation of the catamenia, or subsequently to this period*, is not infrequent. Menstruation, then, often assumes an irregular form — disappearing for months, and returning in a profuse or truly hæmorrhagic form. Generally this circumstance is unattended by material risk. But if the discharge be very great, or occurs often, or if it appears after the age of fifty or after the catamenia have ceased for many months, or for two or three years or more, there is sufficient cause for alarm, and serious disease of the uterus should be suspected. Such returns of youth, with which aged females sometimes console themselves, are rarely unattended by some one of the structural changes already enumerated (§ 226.). I was consulted, however, long ago in a case of a female above sixty, and otherwise in good health, who had returns of uterine hæmorrhage at nearly monthly intervals. No disease was detected upon examination; and she is now alive and well, and in her 74th year. I was very recently called to a lady 47 years of age who had been subject to frequent returns of uterine hæmorrhage during two years, and who was labouring under a dysenteric attack when I saw her. This latter was soon subdued, when the hæmorrhage, and the cause of it, became objects of attention. An examination was made, and a hard fibrous tumour was found in the os uteri. It was soon afterwards thrown off; but the hæmorrhage re-

turned and symptomatic irritative fever continued. An examination was made some days afterwards, and another tumour was found passing into the vagina. This, which was distinct from the former in structure and form, came away soon afterwards, and the recovery was progressive and complete. In this case, the tumours were most probably developed beneath the internal lining of the uterus, and thrown off, in the course of the treatment which was adopted for the arrest of the hæmorrhage.

231. The *symptoms* of uterine hæmorrhage at this advanced epoch of life, are not different from those already described (§ 227.). But they are more generally caused by organic lesions of the womb, than uterine hæmorrhage at the preceding epoch, and complicated with the symptoms which more particularly appertain to the associated lesion. Indeed this constitutes the chief malady; the hæmorrhage being only the contingent, but often the more immediately dangerous, or most alarming, occurrence. The consideration, however, of these associated lesions cannot be entered upon at this place. It is fully entertained in the article upon *diseases of the* UTERUS.

232. IV. OF PUERPERAL UTERINE HÆMORRHAGE. — Under this head is comprised hæmorrhage *during pregnancy or parturition, and after delivery*. — The changes that then take place in the uterus, and particularly soon after parturition, sufficiently account for the frequency of metro-hæmorrhagia, at these periods. — *During pregnancy* there is an actual increase of the vitality as well as of the bulk of the uterus — a state of orgasm of which vital activity and vascular determination are the chief elements. Hence the active nature of the hæmorrhages that take place from it at this epoch. Besides, this viscus contains an organised and living body, presenting intimate relations with it, and opposing certain of the circumstances which favour sanguineous effusions from it. The vascular connection between the uterus and placenta becoming more developed as pregnancy advances, it follows that the detachment of a portion or the whole of the placenta or ovum will give rise to a more profuse hæmorrhage in the advanced, than in the earlier months of this period; but as soon as the uterus has thrown off its contents, and in proportion as the uterus contracts, the disposition to effusion will become less, until it altogether ceases. Hæmorrhage during pregnancy or after delivery may proceed, either from the numerous minute decidual vessels, which connect the ovum to the internal surface of the uterus, and are necessarily torn when the ovum is either partially or altogether separated, or from the semilunar openings seen in the inner surface of the uterus, when the placenta is removed, or from both sources. The opinions of pathologists are divided on this subject; but as long as the exact offices of these openings are undetermined, no precise inference can be arrived at as to this question. However it may be settled, the treatment to be adopted is unaffected by it, inasmuch as the fact is unquestioned, that it is to the partial or entire detachment of the placenta from the uterus, that uterine hæmorrhage, at an advanced period of pregnancy, is generally to be attributed.

233. Previously to the consideration of true puerperal uterine hæmorrhage, the disputed topic as to *the source of the loss of blood* occasionally observed in the earlier months of pregnancy may be briefly referred to. This species of discharge has been considered as a true menstrual evacuation from that part of the uterus, to which the ovum has not become particularly attached by means of the placenta, and that it escapes through the imperfectly closed *os uteri*, owing to the softness of the mucous or albuminous secretion which fills it. But if this were the case, we may reasonably infer, that it would also occur in many instances, in which the os uteri presents a complete obstacle to its exit, and in which it would accumulate and assume the form of internal hæmorrhage. Having met with two or three instances in which I was enabled to inquire into the phenomena attending this kind of discharge, I am of opinion, that it proceeds from the cervix and os uteri, external to the limits to which the deciduous membrane extends; and that it depends upon the active vascular determination, of which the uterus is the seat during the early months of pregnancy. In some cases, this discharge takes place only once, about the usual monthly period, in others oftener; it is generally slight, and of short duration; seldom considerable. It often passes into a somewhat profuse leucorrhœa; and this circumstance indicates that it proceeds from the same seat, and depends upon a nearly similar state of vascular action, as that secretion.

234. *Puerperal uterine hæmorrhage* is somewhat different as to its causes, prognosis, and indications of cure, in the different periods in which it occurs: — 1st. It may appear *before the sixth month of Pregnancy*, and it is then generally active, or dependent upon vascular determination, or a *molimen hæmorrhagicum*; sometimes mechanical, or owing to a local injury or violence, which has occasioned the partial or general separation of the attachments of the fœtus, and connected with *abortion*, the risk of which it announces. — 2d. *During the three or four last months of pregnancy* it may, in some cases, be connected with the same causes, or changes; but it more frequently depends upon the attachment of the placenta upon, or very near to, the mouth of the womb. 3d. It is chiefly to this cause, and to some others about to be noticed, that hæmorrhage takes place *during parturition*; — and, 4th. It is to imperfect contraction of the uterus, that its occurrence *after delivery* is to be attributed.

235. Besides these divisions, there is another to which some attention should be directed. This is into *internal*, and *external*, uterine hæmorrhage. The former often takes place after delivery at the full time, and after abortions; but its occurence during pregnancy, and whilst the fœtus and its envelopes fill the uterus, has been disputed. M. DESORMEAUX observes that, in internal hæmorrhage during pregnancy, the blood is effused either between the uterus and membranes, or within the membranes. When seated between the ovum and uterus it depends upon the same causes as external hæmorrhage, but certain circumstances have opposed the discharge of the blood. ALBINUS found the placenta detached, and a large quantity of coagulated blood interposed between it and the uterus; its circum-

ference being firmly adherent, and preventing the escape of the blood. **Baudelocque** and **Desormeaux** believe that, in rare instances, the external discharge may be prevented by the head of the fœtus pressing upon the neck of the uterus, or by a clot of blood plugging up the os uteri. Hæmorrhage occurring within the membranes is strictly speaking *fœtal;* as the blood in such cases comes from the vessels of the fœtus, and generally from a rupture of the umbilical vessels. These forms of internal hæmorrhage (during pregnancy) have been denied by M. **Duges** and some others. But the facts adduced by **Albinus**, **De la Motte**, **Levret**, and **Baudelocque** indicate, that it actually occurs but in rare instances. M. **Desormeaux** even enumerates the symptoms by which its existence may be recognised. He states that it may be inferred from the presence of the usual symptoms of hæmorrhage without the external discharge; by a sense of weight and of painful tension in the region of the uterus; and by the sensible augmentation of the volume of this organ, generally in an unequal or lobulated form, owing to the effusion occurring exteriorly to the membranes, and being confined to one part. It is obvious, however, that these indications cannot be fully depended upon.

236. *A. Uterine hæmorrhage previous to the sixth month* of pregnancy arises in the manner already stated, from the *causes* enumerated above (§ 224.), or from means resorted to in order to procure abortion, or from some of the other causes adduced in the *article* **Abortion**. At this period, a certain interval elapses between the action of the cause and the commencement of the discharge, during which, symptoms indicating sanguineous congestion of, or determination to, the uterus are manifested; and when a suitable treatment is then adopted, these symptoms disappear, and hæmorrhage is prevented. The causes of hæmorrhage, during this part of pregnancy, are never more influential than at the usual periods at which the catamenia would have returned if the patient had not been pregnant; and it is during these months, that general or local plethora, and mental emotions, causes so frequently concerned in the production of uterine hæmorrhage, seem to be most injurious.

237. *B. a. Hæmorrhage at, or subsequently to, the sixth month* is generally owing to the attachment of the placenta on the neck of the uterus, and commonly appears without any obvious remote or exciting cause. It is generally moderate at first, and either subsides spontaneously or after treatment. But it soon returns as before, is more abundant, continues longer, and does not yield so soon to treatment. Hæmorrhage from this attachment of the placenta generally goes on increasing until the child is destroyed, or delivery is effected. Yet it occasionally commences with great violence, and instantly threatens the life of the female. Sometimes it does not occur until near the natural period of delivery; or it appears much earlier, and returns not until then. M. **Duges** considers that, when the placenta is attached only partially over the neck of the uterus, or laterally, the dilatation of the neck will occasion only a slight or very partial detachment of it, and a moderate hæmorrhage, admitting of being permanently arrested; but that, when it passes over a great portion of the *cervix* and *os uteri*, the discharge, although moderate at first, will return, with greater violence and frequency, and will at last continue until the uterus is emptied, or until the mother and child perish. And, where the life of the female is preserved, the great loss of blood leaves her in a state of anæmia and exhaustion, attended with severe headachs, sleeplessness, or palpitations, and other sympathetic affections.

238. The period of utero-gestation at which this variety of hæmorrhage takes place, coincides with that at which the relation of the placenta with the cervix and os uteri, to which it is attached, is disturbed, and which is usually from the sixth to the eighth month. But it may occur early in the fifth, or in the course of the ninth. The discharge appears without any obvious cause; but it sometimes is hastened by some effort or physical shock, and is even occasionally attended by a sensation leading the patient to infer, that something had given way in the uterine region. During labour-pains the discharge of blood is always increased, whilst it is diminished by the contraction of the uterus in other cases; and, as parturition proceeds, the placenta occasionally passes before the fœtus, which generally dies if this process is not speedily completed. Upon examining the os uteri in this form of hæmorrhage, it is found thicker and softer than usual, and its orifice is occupied either partially or altogether by a soft spongy body, which must not be mistaken for a coagulum of blood. If a coagulum be detected in this situation, it ought not to be disturbed, lest the hæmorrhage be renewed.

239. *b.* But hæmorrhage from the uterus may occur in the latter months of pregnancy, although the *placenta is implanted on the upper part of the uterus.* This, however, is comparatively rare. The blood may be effused in small quantity, and may be chiefly internal. When it is in considerable quantity, and the placenta is separated to some extent, uterine contractions are exerted, terminating in delivery, or in a renewal of the hæmorrhage, from which the patient may expire. This form of hæmorrhage may occur without any premonitory sign; but it is more frequently preceded by a sense of uneasiness or weight, or of pain in the region of the uterus, and other signs of congestion or of active determination. It is most frequently caused by external injury, fright, and concussions of the trunk.

240. *C. During delivery*, a small or moderate quantity of blood is lost, but is rarely pure, being always accompanied with water and mucus. When true hæmorrhage occurs, it is generally owing to the detachment of the placenta by the unequal contractions of the uterus, or to the situation of the placenta near or upon the *os uteri.* In rarer cases, it proceeds from rupture of the parietes of the womb; or from rupture of the umbilical cord. In cases of plurality of children, hæmorrhage may supervene in the intervals between the delivery of each. It is then chiefly owing to effusion from the part of the uterus where the placenta of the first child is inserted, owing to a partial or complete detachment of it. When flooding occurs in the first stage of laoour, the discharge always ceases when

the uterus contracts, and returns during the intervals between the pains.

241. *D. Hæmorrhage after Delivery.* — This may occur previously to the expulsion of the placenta or subsequently. *a.* When it takes place *before the placenta is thrown off*, it is usually owing to one or other of the following circumstances, or at least it is met with in connection with them. 1st. To torpor of the organ; — 2d. To a partial detachment of one part of the placenta and undue adhesion of another; — 3d. To irregular or spasmodic contraction of the womb. It scarcely ever proceeds from the chord, unless in cases of twins, when it may possibly take place. But it may arise from laceration of the uterus or vagina. — *b. After the expulsion of the placenta,* flooding generally proceeds from imperfect contraction, or torpor, of the womb. It may, however, be connected with inversion, or with retention of a portion of the placenta, or of the membranes, in the cavity or mouth of the organ; and in a few cases it appears to depend upon active determination of blood to the uterine vessels, as insisted upon by Gooch, after some Continental writers. These states of the uterus, especially flaccidity, may be readily inferred from a careful examination and observation of the symptoms. Whether the hæmorrhage takes place before or after the expulsion of the placenta, it may be either *internal* or *external*.

242. *c. Internal uterine hæmorrhage*, after delivery, may thus take place before the expulsion of the placenta or afterwards, or it may be favoured by the retention of the placenta or of the membranes, or of both, partly in the neck and mouth of the womb, and partly in the vagina. That this form of hæmorrhage should be early detected and remedied, is of the utmost importance. The uterus upon external examination will be found soft, roundish, and increasing in bulk, so as often to approach, or even to pass, the umbilicus. It may even ultimately attain the dimensions it had just possessed, and be followed by the death of the female, or by a prolonged and difficult recovery. Whenever pallor of the countenance and lips, vertigo or swimmings, noises in the ears, a sense of sinking, nausea, or retching; a very rapid and irregular pulse, a quick anxious or gasping respiration; restlessness, jactitation, &c. supervene, whilst the lochia are not more than usually abundant, or are diminished, internal hæmorrhage to a most dangerous extent may be inferred; and a careful examination of the abdomen ought to be made. In order to ascertain the cause of the retention of the effused blood, the expulsion of all the placenta and membranes should be proved; as well as the presence or absence of a portion of these, or of coagula, in the os uteri and vagina. At the same time, distension of the uterus by effused blood must not be confounded with the existence of another child in the womb, or with meteorismus, or with a distended urinary bladder, either of which cannot be mistaken if attention be directed to it, and to the existence of the symptoms just enumerated.

243. *d. External flooding* after delivery of both the fœtus and placenta is not to be mistaken, if due attention be paid the patient; for the blood may collect and coagulate in the centre of the bed, in the depression produced by her weight, and be overlooked, if she be exhausted and carelessly attended. This variety of hæmorrhage occurs in every degree of severity, and is either gradual, draining, and continued; or rapid, violent, alarming and even speedily fatal; or remittent, intermittent, &c. It is accompanied with all the symptoms already noticed in connection with this (§ 228.), and other severe forms of hæmorrhage, and is followed by most of the phenomena caused by extreme losses of Blood, as described in that *Article* (§ 53. *et seq.*). Whilst *internal* or *concealed* hæmorrhage is almost uniformly dependent upon a total want of uterine action, the *external* form arises either from that state, or from imperfect, irregular, or transient contractions, and from either of these states in connection with vascular determination to the womb. When slight, continued or draining, it may be kept up by the retention of a portion of the placenta or membranes, or of fibrinous coagula, in the uterus. It is important to keep in recollection these pathological states, as upon them the appropriate use of remedies entirely depends.

244. ii. Prognosis. — The circumstances which indicate a favourable or unfavourable result in other hæmorrhages, also apply to the different forms of uterine hæmorrhage. But the condition of the uterus, in both the unimpregnated and puerperal states, and the period of gestation, with various other related circumstances, must be considered in reference to particular cases. *A.* In *uterine hæmorrhage occurring independently of the puerperal states,* the prognosis should entirely depend upon the nature of the causes, the states of the uterus, the severity of the symptoms, the duration of the disease, and the strength of the patient. When it is induced by occasional causes of a passing or accidental nature, danger will arise only from the quantity of the discharge. If it proceed from causes which have modified the constitution, and endowed it with a tendency to hæmorrhage, or occasioned an habitual discharge, the treatment will generally prove difficult or unsatisfactory. That variety, which occurs in girls at the periods of puberty, ceases spontaneously as the menses become regular; and that which takes place at the critical age of woman, also disappears with the monthly indispositions, if the womb be free from organic changes. When it proceeds from these changes, the prognosis should be guarded, even when circumstances admit of it not being unfavourable. In these cases danger may arise from the hæmorrhage, as well as from the nature of the lesion of the uterus; but more frequently this latter is the chief source of risk, unless where the morbid formation admits of removal, as in the case of *polypus uteri*. (See *art.* Uterus.)

245. *B. Uterine hæmorrhage during the puerperal states* is often one of the most alarming and speedily fatal of the maladies peculiar to females. According to Puzos, it is rarely fatal before the fifth month of gestation. Experience has shown the justice of the remark; yet I have seen life in imminent peril at this early period. Flooding is the more dangerous the nearer it occurs to the natural period of delivery, whether previously or subsequently to this process. As respects the fœtus, however, the chances of its preservation diminish with the length of the time to the period

of birth.—Hæmorrhage from insertion of the placenta on the neck or mouth of the womb, is always attended by danger, varying with the violence of the discharge, and requires the speedy acceleration of parturition to save either the mother or child. *Internal,* is much more unfavourable than *external,* hæmorrhage. The latter, when slight, is often its own cure, by removing plethora, or vascular determination. But the former has frequently proceeded to a dangerous or even fatal extent, before the medical attendant is made aware of its accession. Moreover, in order to arrest it, the uterus must be emptied of its contents; and this often increases the exhaustion, or causes a further loss of blood. In either internal or external hæmorrhage, when the pulse becomes very frequent (above 120), small, thready, or irregular; the breathing suspirious or gasping; the motions convulsive, with shudderings, or jactitation; or the sinking and anxiety distressing; and if full syncope supervene, notwithstanding the supine posture and low position of the head, great danger exists, and the patient may either suddenly expire, or recover slowly and with great difficulty.

246. iii. Treatment.—*A.* Hæmorrhage from the uterus *previously to puberty* seldom requires more than moral treatment. — *B.* When it *occurs at or after puberty, independently of the puerperal states* — 1st, The occasional causes should be avoided; — 2d, Means appropriate to the pathological states producing it, ought to be used for its arrest chiefly when it is excessive; — and, 3d, Measures should be directed to prevent its return when the nature of the case indicates that a return is probable. The fulfilment of the *first* intention will often accomplish the *third,* and will generally promote more or less the success of the *second.* — *a.* In a great majority of instances, the hæmorrhage is the result of active determination or of congestion; and it is often connected with a chronic or slight grade of inflammatory action. In these circumstances, the discharge ought not to be arrested by astringents or tonics; for I have seen this kind of interference convert a slight and salutary hæmorrhage into a severe or chronic inflammation. Yet it is not always judicious to allow the discharge to continue, inasmuch as the uterus might thereby contract a disposition to hæmorrhage, or to some other disease. It will be better to attack at once the pathological conditions — general or local plethora, or local vascular excitement—upon which the disease depends, by general or local depletions, by internal refrigerants, by a strictly antiphlogistic diet and regimen, and by repose of mind and body. The patient should be placed in a cool and airy apartment, and preserve the horizontal posture on a bed or couch which is neither too soft, nor too warm. The nitrate of potash, vegetable acids, and acidulous fruits should be given from time to time; and the circulation may be equalised by cooling diaphoretics, as ipecacuanha, hyoscyamus, and nitre, with small doses of camphor. Ipecacuanha, in free or frequent doses, is one of the best remedies that can be prescribed; and when bilious colluvies require to be removed, it may be given so as to procure full vomiting, as advised by Stoll, Finke and others. Constipation ought always to be prevented; but heating and irritating cathartics ought to be withheld. The tartrate of potash, or of potash and soda; tamarinds, or the supertartrate of potash with the confection of senna, the inspissated juice of the sambucus, &c., or any of the aperient electuaries in the *Appendix* (F. 82. 96. 98.), and mild laxative enemata are the most appropriate. *Derivatives,* as warm manuluvia, are occasionally of use, and are advised by Hoffmann and Lordat. Duges and some French practitioners direct the application of cupping glasses on the mammæ. When bloodletting has been employed, or is not indicated, *dry cupping* over the loins or sacrum may be resorted to. *Opium* and other narcotics are most beneficial in the form of Dover's powder. It is only in the more urgent cases, that cold either externally, or in lavements, and other means about to be recommended, need be prescribed.

247. *b.* If the hæmorrhage has passed into a *chronic,* or into a *passive* state, the foregoing treatment is no longer appropriate. Tonics and astringents are then required; especially the preparations of catechu, or those conjoined with opium as directed by Wendelstatt; the muriated tincture of iron; the terebinthinates and balsams; the superacetate of lead and opium; the sulphate of alumina or the metallic sulphates; and the other astringents already recommended for other asthenic or profuse hæmorrhages (§ 40–45). It is in the passive form of the disease that the *secale cornutum* seems to be most serviceable. It may be given in decoction or powder. De Wedekind and Sauter advise the exhibition of the *Juniperus Sabina,* in doses of from ten to twenty grains of the powder, thrice daily, but it should be exhibited with caution, and its effects attentively watched.

248. *c.* In *delicate or nervous females,* in whom metro-hæmorrhage soon assumes a passive character, and gives rise to various nervous affections, an early recourse to restoratives, astringents, and sedatives, is often necessary. *Camphor,* with nitrate of potash and opium or hyoscyamus, in conserve of roses; Dover's powder with catechu; the infusion of roses with sulphuric acid and anodynes; the balsam of Peru or of Tolu, in the form of pills, with magnesia, or powdered rhubarb, or with oxide of zinc, and small doses of opium, according to the peculiarities of the case, may be severally employed.

249. *d.* If the hæmorrhage continue, or become excessive, or occasion exhaustion, or any alarming symptom, the use of cold externally and internally has been very generally recommended. Hoffmann and Leake advise cold fluids to be taken in large quantity; Pezold, very cold clysters, and the external application of pounded ice to the hypogastrium; numerous writers, various cold epithems, on the loins, tops of the thighs, vulva, &c.: and many recent authors, the cold affusion on these situations. But these require much discrimination. They are not always appropriate in the passive states of the disease, and they are serviceable chiefly when the active form has become excessive or dangerous. Yet I have seen recourse to them fail, in some instances, and productive of injury, in others. If resorted to prematurely, they may be followed by inflammatory action in the uterus, peritoneum, &c., or by severe rheumatic attacks.

I have, therefore, had recourse, in extreme or prolonged cases, to the spirits of turpentine, either in a draught, or in an enema, or in the form of epithem or fomentation applied over the hypogastrium; and always with success. — This practice was first adopted by me in 1819, in metro-hæmorrhagia occurring after delivery, and has been pursued by me in other hæmorrhages, whenever it was considered advisable speedily to arrest them. In 1820, I publicly recommended this treatment; and I know, that it has succeeded with those who were thus led to employ it.

250. *e.* When the hæmorrhage is *symptomatic of organic disease of the uterus*, it is generally prolonged, or returns frequently, and is injurious more from this circumstance, than from its violence at any particular time. It is also often remittent, or periodic, the intervals varying in different cases; but the discharge generally subsides spontaneously after local plethora or determination is removed, and returns again as soon as the organic change has established vascular fluxion, or congestion in the uterine organs. Although merely a symptom of the existing organic lesion; yet its frequent recurrence, and the consequent anæmia, sinking, and serious nervous symptoms, require that it should receive the chief attention in the treatment; — and that tonics, astringents, restoratives and anodynes, should be liberally, but appropriately, exhibited. When the hæmorrhage is symptomatic of ulceration, or of malignant disease, injections, *per vaginam*, with the solutions of the *chlorides*, particularly of the chloride of lime, or with pyroligneous vinegar, or with solutions of *kréosote* should be resorted to, in addition to the means just mentioned. When it is occasioned by a polypus, or by a tumour on which a ligature may be placed, then this ought to be applied.

251. The *third intention*, viz., to *prevent the return of metro-hæmorrhagia*, need hardly be enforced in the accidental form of the disease; but it is of the first importance in the constitutional, habitual, or periodic states. In order to fulfil it, the remote causes ought to be removed or avoided; and the patient be placed upon a strict diet and regimen. Every source of local and of general and mental irritation should be shunned. The horizontal posture ought to be retained as long as possible for some time previously to, and during, the discharge; and, in the intervals only, gentle exercise should be taken in the open air. The food ought to consist chiefly of mucilaginous and farinaceous articles, of easy digestion; and asses' milk, with Seltzer water, as advised by Hoffmann may be used both as a beverage, and as an article of diet. The patient should be kept cool; she ought to sleep on a mattrass, rise early, or remove to a couch: and, if she be married, lie apart from her husband. If the hæmorrhage be active and dependent chiefly upon general or local plethora, a small bloodletting from the arm may be resorted to just before the expected accession of the hæmorrhage; or small and frequent doses of ipecacuanha, so as to occasion either nausea or vomiting, may be tried as directed by Hoffmann, Ranoë, Holst, Dalberg, and others. — In cases depending chiefly upon debility, the preparations of cinchona, of iron, or of other tonics; the cold plunge or shower bath and salt-water bath; the mineral waters of Tunbridge or of Bath; the factitious waters of Pyrmont, Spa, or of Seltzer, and a light diet; will be of great service. When the recurrence of the discharge is owing to organic lesion, cold bathing is inappropriate, and the mineral waters just mentioned require to be tried with circumspection. Those of Ems of Carlsbad, or of Marienbad, however, will often be employed with benefit.

252. *C. Treatment of puerperal metro-hæmorrhagia.* — *a. Previously to the sixth month*, uterine hæmorrhage should be treated altogether as described in the article Abortion. If the fœtus and membranes have entirely come away, and the discharge continue from a passive state of the uterus, the exhibition of spirit of turpentine in an enema, will rarely fail of arresting it; but the practitioner should ascertain that no part of the placenta or membranes remain in the uterus or vagina, causing irritation and prolonging the discharge. When the uterus is thus inactive, after abortions, the *secale cornutum* or *borax*, or the spirits of turpentine may likewise be exhibited to procure its contraction.

253. Desormeaux considers that hæmorrhage may take place in the early months of pregnancy, so as partially to detach the placenta, but that the clot that is formed between it and the uterus will often arrest the hæmorrhage and adhesion of the detached portion subsequently occur; and he refers to a case by Noorthwyk, in support of his opinion. On this ground he advises having recourse, at the earlier periods of gestation, to *plugging* the vagina, as recommended by Leroux, after bleeding and the usual means of arresting the hæmorrhage have failed. (See Abortion, § 26. et seq.) At these periods, the uterus is still more or less unyielding, and the resistance to further effusion is considerable. But, in slight attacks, or at the commencement, the obstacle afforded by the plug may hasten the complete detachment of the ovum, by favouring the accumulation of blood between it and the uterus; and either a copious internal hæmorrhage may thereby be produced, or the ovum, being detached, may be prevented by it from being thrown off, and be retained for a long period, keeping up irritation and hæmorrhage, or a continued draining with occasional exacerbations, or a putrid discharge. Indeed, this occurrence is not rare in the early months, independently of the plug, although the use of it before the expulsion of the ovum, and when the os uteri is soft or yielding, is more likely to occasion than to prevent it. When, however, the os uteri is firm, and the discharge copious, it is often of service; but it is chiefly after the ovum is expelled, in cases of flooding before the fifth month, that plugging is most efficacious, if efficiently employed. Care should be taken that the plug do not press injuriously upon the urethra: Mr. Ingleby directs that it should remain undisturbed for twenty-four hours or longer; but the supervention of internal hæmorrhage should be kept in view, and the case carefully watched.

254. When the blood escapes in small quantity only, and there are no pains present, and no disposition in the os uteri to dilate, the constitutional powers being unimpaired, an attempt should be made to prevent a return of the dis-

charge, by the means already described both in this article and in that on Abortion. But, as Dr. R. Lee justly remarks, where the flooding is profuse at first, or is renewed with violence, in spite of efforts to check it, the continuance of pregnancy to the full period cannot be expected, and it will be of no avail to take blood from the arm, and to administer internal remedies with any other view than with that of arresting the discharge, and thereby averting danger. In these circumstances the speedy evacuation of the uterus is the chief indication, as the slightest cause may reproduce the hæmorrhage, in an alarming manner, whilst the partially detached ovum remains. But, in the early months of pregnancy, this intention is not so easily accomplished, as at later periods. *Puncturing* the membranes in order to excite the uterus is advised by Rigby, R. Lee, and Merriman; but, before the fifth or sixth month, this may not be easily performed; and, until the sixth or seventh, the hand, however small it may be, will not readily be admitted into the uterus. The *ergot of rye* has been recommended by Neale, Negri, Ryan, and numerous American as well as European practitioners, in order to procure the contraction of the womb in such cases. It may be given in powder, or in decoction, with three or four drops of the oleum Pulegii, as advised by Dr. Ryan. I have prescribed it successfully both alone and with from ten to twenty grains of the sub-borate of soda. An enema, containing an ounce or an ounce and a half of spirit of turpentine may be thrown up, if these fail. A judicious recourse to these means will generally supersede the use of the plug or puncturing the membranes, the propriety of which latter before the sixth month is denied by Mr. Ingleby and some others. Wherever, in such cases, the end can be obtained by the use of medicine, recourse to any operation, however trifling, should be avoided. Instances, however, may occur about the fifth or sixth month, in which perforating the membranes is required, in addition to the other means just advised. The cold affusion or the dashing of a wet napkin against the external parts, or the application of the turpentine epithem on the hypogastrium, may be also resorted to, when the case becomes urgent.

255. *b.* When in the *third or fourth months*, the hæmorrhage is continued, draining or remittent, a merely partial evacuation of the uterus should be suspected, more especially if the discharge become offensive; or, if the fœtus with the whole of the appendages have been ascertained to have come away, a flaccid or relaxed state of the uterus may be inferred. In such cases, a careful examination will discover one or other of these states, which will generally be removed by the medical means just advised, and especially by the exhibition of the spirit of turpentine by the mouth, or in enemata. The recommendation of Drs. Haighton and Blundell to inject the uterus with astringent fluids, if at all advisable, is most likely to be serviceable in cases where a portion of the ovum has been retained in the uterus, and is passing into decomposition.

256. *c. Hæmorrhage after the sixth month*, although occurring most frequently from attachment of the placenta upon the *cervix uteri*, may also take place when this does not exist. In this stage of pregnancy, as well as at earlier periods, if the discharge be in small quantity or moderate — if it have not proceeded with much rapidity — if it stop soon — if no large clots be formed in the vagina — if the cervix have its usual feel, showing that the placenta is not attached there, and that no large coagula are retained in the os uteri — if the child be still alive — if there be no indication of the accession of labour — and if the discharge become pale and watery — we may conclude, with Dr. Burns, that the full period of gestation may be reached. In this case, the treatment already directed in active hæmorrhage ought to be adopted. But where the effusion is profuse, or continues, and the strength of the patient is impaired by it, the fœtal membranes should be punctured, the liquor amnii evacuated, and the uterus roused to action by the means just advised (§ 254.), aided by frictions over the hypogastrium, and by dilation of the os and cervix uteri.

257. *d. When the placenta is attached over the cervix uteri*, as evinced, on a careful examination, by its fibrous vascular structure; by its adhering to one part of the uterus, and being separated at another; by the renewal of the hæmorrhage during labour pains; and by its occurrence without any obvious exciting cause, the utmost decision and dexterity on the part of the practitioner is required. If flooding occur to an alarming extent in the seventh or eighth months, an examination should be instantly made, and while the blood is actually flowing. In some cases, where a small portion of the placenta lies over the os uteri, coagula may close the orifices of the bleeding vessels, and the patient may go on to the full time. In these, the hæmorrhage is seldom very profuse; and this result cannot be expected. The general recurrence and increased violence of the effusion, until the patient either expires, or is delivered by art, demand that a rule of practice should be laid down; and the rule first devised by Levret, and now generally received, is *the speedy performance of artificial delivery*. Dr. R. Lee states that he has seen only one case of flooding from the position of the placenta, followed by recovery, without artificial delivery; and, in order to accomplish this, he recommends the hand to be passed into the vagina, as in turning, without waiting for the pains of labour, or the dilatation of the os uteri, and carried steadily forward through the os, in a conical form, between the uterus and placenta, at the part where their separation has taken place. The membranes are then to be ruptured, and an inferior extremity of the child brought down, and the infant and placenta slowly extracted. The hand, however, should not be forcibly introduced whilst the os uteri is rigid and undilatable. Until it becomes soft, the flow of blood should be checked by the recumbent posture, by cold applications and the *plug*. But this latter ought not to be inserted when the os uteri is soft and dilatable. In the rigid state of this part, in hæmorrhage from this cause, it will command the effusion, until the operation of turning can be safely performed; but, as soon as this may be attempted, it becomes inadmissible.

258. *e. If flooding occur during the first stage of labour*, at the full time, the membranes should be immediately ruptured, as recommended by Clement, Puzos, Kok, Rigby, Baude-

locque, Denman, Merriman, D. Davis, Blundell, Lee, Ramsbotham, Sweatman, and others; but if the discharge should still continue, and the pains become more and more feeble, and the patient exhausted, delivery must be accomplished by turning, by the forceps, or even by embryotomy, according to the circumstances of the case. In less imminent cases, the ergot of rye and other means already mentioned (§ 254.) may be tried before recourse be had to these operations. Mr. Ingleby, however, considers that many of this description of cases are occasioned by the injudicious use of the ergot; but, when it is employed for the arrest of the discharge, and for the purpose of procuring uterine action, this objection does not apply either to it, or to other means intended to exert a similar operation. After the liquor amnii has escaped, the os uteri still remaining rigid, there are objections to the exhibition of the ergot: and in such a case, plugging the vagina, as advised by Burns, Dewees, Capuron, Gardien, Davis, &c., may be resorted to, with the aid of friction and moderate pressure on the abdomen in order to increase uterine action. The possible occurrence, however, of internal hæmorrhage should not be overlooked; and if this take place, the still more active interference just mentioned must not be delayed. But the plug should not supersede rupturing the membranes when flooding occurs at the commencement of labour at the full time.

259. *f. Hæmorrhage after the birth of the fœtus,* and before the expulsion of the placenta, is frequent and often sudden and profuse. In this case, strong pressure should be made over the hypogastrium in order to excite uterine action. A binder ought to be firmly applied over the abdomen, several folded napkins being placed under it, so that the fundus uteri be compressed. Dr. R. Lee advises the hand afterwards to be introduced to remove the placenta, but the removal of it should not be attempted until contraction of the uterus commences. After contraction, and the expulsion or withdrawal of the placenta, he directs a cloth wet with cold vinegar and water to be applied to the external parts, cold acidulated drinks to be given from time to time, and the patient to be preserved for two or three hours in a state of perfect repose. This plan will generally succeed when the hæmorrhage and retention of the placenta are caused by inactivity of the uterus. But when irregular action of the organ, or spasmodic contraction of the *os internum* or *externum uteri*, retains the placenta either altogether or partially, and thus causes *internal* hæmorrhage, additional means, especially the exhibition of opium by the mouth, are required. The passage of the hand, in order to remove the placenta, then demands caution and perseverance. If it cannot be accomplished, the turpentine enema, or embrocation, will generally aid in removing the difficulty. If the flooding arise from morbid adhesion of a portion of the placenta, the adhesion must be separated by the hand, in a manner that will readily suggest itself. Dr. T. Ramsbotham attributes these adhesions to partial separation of the placenta during pregnancy, from some accidental cause, followed by a slight discharge, the extravasated blood exciting inflammation of the separated surfaces with effusion of lymph, and consequent agglutination of them. This opinion is probably correct.

260. *g. Flooding after the expulsion of the placenta* requires a modified practice according as it arises. — 1st. From atony of the uterus; — 2d. From imperfect or remitting contractions; — 3d. From a portion of the placenta left in the uterus: — and, 4th. From inversion of the organ. As in hæmorrhage previously to the complete expulsion of the placenta, so in this the blood may be retained in the cavity of the viscus, by coagula, or by a portion of the secundines lodged in the os uteri or vagina. In every case, therefore, the state of the uterus and the integrity of the placenta should be ascertained. — Where simple atony of the uterus is the chief cause, constant and well directed pressure on the fundus uteri, especially by the hand, the sudden application of cold, or effusion of cold water; the turpentine enema, or draught; the ergot, &c.; are the most efficacious means. If the hæmorrhage be internal, from any of the causes just stated, the same measures will generally procure their removal, by contracting the uterus; but if these fail, they should be removed by the hand. The draining or recurring hæmorrhage, the expulsion of clots, the offensive nature of the discharge, and the constitutional effects consequent upon the presence of a portion of the placenta in the uterus, demand at first the same means as other states of the disease; but afterwards, and particularly when serious constitutional symptoms supervene, indicating a remarkable diminution, and marked vitiation, of the vital current, additional or other remedies should be employed. Weak solutions of the chloride of lime, or of soda, should then be injected *per vaginam*, or even into the uterus; and the decoction of cinchona with the chlorate of potash, or with muriatic acid; camphor in frequent doses; an occasional enema with spirits of turpentine, or draught with the same and castor oil; the sub-borate of soda, and other means calculated to support the vital energies, to increase the excreting functions, and to enable the uterus to contract and discharge the matters retained in it, should be prescribed.

261. The occurrence of hæmorrhage after delivery, whilst the uterus appears to be contracted, upon which Dr. Gooch has so unnecessarily insisted, is nothing more than its connection with an imperfect, remitting, or irregular contraction, in some cases, and with determination of blood in others; states previously known to the profession, and requiring, at most, but a modification only of the means insisted upon in the course of this article. In these, as well as in other cases, the application of pounded ice has been much praised; but the continued application of great cold is less beneficial than the shock produced by the affusion of moderately cold water, or by dashing a wet napkin upon the hypogastrium and external parts. Indeed the former may cause an imperfect or irregular contraction to pass into a state of relaxation, and thereby perpetuate the hæmorrhage. With respect to the hour-glass contraction of the uterus, insisted upon by Dr. Burns and others, in connection with flooding, the perspicacious remarks of Dr. Malins should be borne in mind. This acute physician observes that, as the contraction

of the uterus in the unimpregnated state, dividing it into two portions, disappears under gestation, the whole uterus then forming but one spheroidal cavity, so the removal of the distending causes allows the organ to recover, in a great degree, its original shape during contraction, and that thus two cavities again exist in some measure, divided by that contraction usually denominated the os internum uteri, perfectly natural indeed in character, but to which the name of hour-glass contraction as denoting a preternatural state, has been in error so constantly applied. The contraction of the circular fibres, which thus takes place, dividing the upper part of the genital canal into two chambers, when excessive, the other portions of the organs being relaxed, is not infrequently associated with hæmorrhage either whilst the placenta is still retained in the upper chamber, or after it has been thrown off, coagula filling the lower cavity, formed by the cervix uteri. The introduction of the hand into the uterus in order to excite it to action, or to press upon the part to which the placenta was attached as advised by Dr. Gooch and others, can seldom under judicious management, be necessary; and it is very doubtful if it will ever prove serviceable. Plugging the vagina, after delivery at the full time, requires the utmost caution and constant watching, even when the uterus is firmly contracting, as it may favour dangerous internal effusion.

262. D. *The management of a patient after dangerous uterine hæmorrhage* constitutes an important part of the treatment. Although the uterus is firmly contracted, and the patient seems comfortable, yet she ought not to be considered as altogether safe, as the uterus may again relax and the hæmorrhage return. This contingency ought to be guarded against by applying a proper binder, by perfect repose, and by a full dose of opium, if irritability or restlessness exist. Her position ought not to be changed for several hours, and the horizontal posture must not be departed from on any occasion. The room should be darkened and well ventilated, and nutrient but light fluids, in moderate quantity, should be given at stated intervals.

263. iv. The particular remedial Measures advised by Authors for Uterine Hæmorrhages require but little notice, after the full exposition of the treatment given above. — *a. Vascular depletions*, either general or local, are directed by several writers, and particularly by Schenck, Lefevre, and Pelargus; but they are admissible only in the more active states, and as means of prevention, especially in these. When practised so as to derive from the seat of hæmorrhage, some advantage may accrue from *local depletions*, more especially from cupping over the sacrum or under the mammæ, as advised by Hippocrates and Actuarius. Several of the ancients resorted to cupping on the breasts; Galen directed this operation to be performed over the hypochondria; and Gondret prescribed *dry cupping* with large glasses, between the shoulders. *Emetics* have been prescribed in order to derive the circulation from the uterus, after bloodletting has been resorted to, by Stoll, Gendron, Reidlin, and Kortom. Conradi employed them to procure contraction of the uterus, and the expulsion of coagula in uterine hæmorrhage after delivery. They are certainly serviceable in some cases, but they require discrimination, and their effects ought to be carefully observed.

264. *b. Internal refrigerants*, particularly nitre and cold drinks, have been praised by several of the older writers. MM. Martinet and Deslandes have recently given the *nitrate of potash* in remarkably large doses — as much as six drachms in the twenty-four hours. It is not appropriate in cases of puerperal hæmorrhage, although it is sometimes of service in the active forms of the disease unconnected with pregnancy. I have given it in hæmorrhage after abortion, but with little or no benefit. The *muriate of ammonia* is more likely to be serviceable, especially in cases of debility, and when the discharge is draining or remittent. It may then be given with cinchona, or small doses of opium.

265. *c.* Of the application of *cold*, little further need be stated. It has been generally prescribed by writers from Hippocrates to the present time. Collomb, Doemling, Gauthier, Hiensius, Chaussier, and most modern authors, recommend it both internally and externally, in the forms of epithem and injection. Ranoë, Loefler, Josephi, D. D. Davis, and Olivier, direct cold drinks; whilst Fieliz and Thomann consider cold in any form inappropriate in uterine hæmorrhage after delivery, and in the passive states of the disease. There is much justice in this. The recourse to cold requires great discrimination; for, if too long applied, or if the cold be too great, much mischief may be produced by it. The sudden and temporary application of cold, so as to produce more or less shock to the frame, is certainly more beneficial, and more generally appropriate, than a prolonged recourse to it.

266. *d. Astringents* have been very generally administered both by the mouth, and *per vaginam*, in metro-hæmorrhagia. *Aluminated whey* has been prescribed by Lentin, Pasta, Müller, Lindt, Stroem, and Hufeland. Thilenius has directed it to be employed topically, by means of a sponge. Wendt and Aaskow have recommended the *sulphuric acid* with laudanum; Gebel the tincture of *muriated iron;* and Fothergill, Carron, and Wendelstatt, the preparations of *kino*, or of *catechu*. These medicines are even now in general use, but are most beneficial in the more passive states of the disease, unconnected with pregnancy or childbirth, and when the discharge is moderate and prolonged. Of the numerous astringents mentioned by writers, the *superacetate of lead*, in doses of two grains to six or seven, repeated according to the urgency of the case, has been most praised by modern authors, and especially by Reynolds, Heberden, Mitchell, Young, Williamson, Amelung, Thomson, &c. When the flooding is profuse, or occurs in connection with childbirth or abortion, only the most energetic astringents and the most rapid in their effects ought then to be given internally; and of these, the *spirits of turpentine;* the *ergot of rye* (Spajrani, Cabini, &c., in *Ann. Univers. di Med.*, 1830); and the *superacetate of lead*, in large doses, with opium in *acetic* or *pyroligneous acid*, are most deserving of notice.

267. *e.* The more *energetic tonics*, in large doses, have likewise been directed. They are appropriate in cases of debility, when the discharge is

prolonged without being excessive; and when it is unconnected with pregnancy or active determination to the uterus. In these circumstances, and when the disease is periodic, the preparations of *cinchona* have been prescribed by Stroëm, Starke, Duncan, Bang, Picque, &c.; the tincture of *cinnamon* by Plenck, Vogel, and Schneider; and the *sulphate of iron*, and other chalybeates, by Rath, Thilenius, and Doemling. The *sulphate of quinine* with sulphuric acid and tincture of cinnamon, or with sulphate of iron in the form of pill, will be given with advantage in many cases of this description.

268. *f. Ipecacuanha* in small doses has been much used by Paulisky, De Meza, Bruck, Holst, Loeffler, Stoll, Dalberg, Denman, and others; and small quantities of *tartar emetic* have been recommended by Chalmers. The former of these may be useful when the uterus contracts irregularly, and when the placenta is retained from this cause. But it is chiefly in combination with opium, or in frequently repeated doses, that any advantage can be expected from it. In hæmorrhage after delivery, but little benefit will be derived from *opium*, especially if given in large quantity, or depended upon chiefly. When thus exhibited it will rather impair than promote the contractions of the uterus. Yet circumstances will sometimes arise to justify the praises of opium expressed by Horstius, Heister, Young, Smellie, Ranoë, Chesneau, and Garthshore, especially in uterine hæmorrhage unconnected with pregnancy, or in that occurring in the earlier months of gestation. In these cases it may be given with dilute sulphuric acid (Aaskow); or in *clysters*, as directed by Mr. Copland. Harcke advised it to be used in injections thrown into the vagina — a method by no means to be advocated: and every practitioner of experience will be aware of the danger of administering opium, unless in very small quantity, in the form of enema.

269. *g.* In *passive metro-hæmorrhagia*, particularly when the powers of life are depressed or exhausted, *brandy* or other spirits have been resorted to by many practitioners, often in large quantity. Stimulants of this description are apt to give rise to a very serious affection of the head, and to protract convalescence. *Ammonia*, or *camphor* (Ettmüller), is less objectionable in such circumstances; and a judicious recourse to spirits of *turpentine*, as advised above, is much more efficacious, and less hazardous. — Of other internal medicines recommended by writers, no further notice than the simple enumeration of them need be taken. The *fungus militensis* has been mentioned by Linnæus; the *bursa pastoris*, by De Meza; the *geum urbanum*, by Stroëm; the decoction of the fruit of the *hippocastanus*, by Hufeland; *tannin*, by Cavalier; *savine*, by Rave, Fiest, and Wedekind; *purgatives*, by Lentin, Strack, and Conradi; and the *pimpinella*, by Riedlin. Whatever effects these may produce in the hæmorrhages occurring independently of pregnancy, but little benefit can be expected from them in those supervening during the puerperal states.

270. *h.* Various *external means* of arresting flooding after delivery have been adopted, and frequently with success. *Friction of the abdomen*, particularly when the uterus contracts either imperfectly or irregularly, and *compression* over the fundus of the organ by the hand, or by *compresses*, *bandages*, &c., have been very properly insisted upon by Levret, Tallony, Zeller, Vogel, Smellie, Osiander, Ingleby, Ramsbotham, R. Lee, and by most modern writers. Loefler directed that pressure should be made by means of a sand-bag. Dr. D. Davis and Dr. Beatty have recommended *bandages* constructed on purpose. Pressure on the descending aorta, through the abdominal parietes, has been favourably mentioned by Latour and Ingleby. Ploucquet advised the pressure to be made by the hand introduced into the relaxed uterus; and Eichelberger has adduced an instance of the success of this method. *Injections* of various kinds into the uterus have been employed. Prosper Alpinus, Thilenius, and Pasta prescribed the mineral acids much diluted; Galen, the juice of the plantago; Astruc, diluted vinegar; and Kok, astringent infusions, in this way. Fieliz directs the hand wet with vinegar; Wendelstatt, lint moistened with much-diluted sulphuric acid; and M. Gorát, a decorticated or divided lemon, to be passed into the uterus.

271. *i. Plugs* or *tampons*, moistened with various astringent fluids, have been very generally resorted to since the praises bestowed on them by A. Parey, Hoffmann, Leroux, Thilenius, Trioën, Held, Loeffler, Humberg, and Smellie. Some modern British authors have, however, supposed, that the addition of astringents is unnecessary, although they approve of the plug in nearly the same circumstances in which I have recommended it above (§ 253.), namely, when the os uteri is rigid. Soft lint or sponge may be used; but in such a manner as to fill completely the upper part of the vagina.

272. *k.* When all other means have failed — when the face is blanched; respiration is scarcely audible, or gasping or hurried; the pulse almost imperceptible or gone; the extremities cold or clammy; the power of deglutition lost — *transfusion* should be resorted to, although the chances of success from it are few. Dr. Hamilton has, however, seen recovery take place from this state by the ordinary means; but so fortunate an issue is rare. The question only is, whether the practitioner should still persist in the use of some of the more appropriate means, or have recourse to transfusion. The contingencies of resorting to it ought not to be kept out of view; for, if air pass into the vein, immediate death will follow. Phlebitis may even supervene although the operation has succeeded, and carry off the patient. The propriety and success of this measure have, however, been so far established by Dr. Blundell, Ingleby, and by some others, who have attempted it in circumstances of more doubtful propriety, as to justify the having recourse to it as an *ultimum sed anceps remedium*.

273. *l. The prevention of uterine hæmorrhage*, particularly in the puerperal states, is a subject of great importance. In the early months, the precautions recommended in the *article* on Abortion (§ 26. *et seq.*) should be adopted. In order to prevent hæmorrhage after delivery, Dr. Beatty and others advise an appropriate binder to be passed loosely round the abdomen, and drawn tight as circumstances may require. I am con-

vinced that a moderate degree of pressure on the parietes of the abdomen after delivery is of service in preventing not only uterine hæmorrhage, but also some other diseases, especially the different forms of puerperal fevers, &c.

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274. X. Of Hæmorrhage into serous or shut Cavities. — Owing to the organisation of serous membranes, hæmorrhage very seldom takes place from them ; the vessels with which they are supplied rarely experiencing that degree of relaxation admitting of the exudation of blood, or even of a portion of its colouring particles. When blood is effused into cavities formed by serous membranes, it proceeds from one or other of the following sources : — 1st, From the rupture of an aneurism ; — 2d, From the erosion, ulceration or rupture of an artery or vein ; — 3d, From rupture or laceration of an organ or part ; — 4th, From relaxation of the vital cohesion, with which the serous tissues and extreme vessels are endowed ; — 5th, From deficient crasis, or other

changes in the blood; — and, 6th, From the coexistence of the last two conditions. Hæmorrhage may occur from the first, second, or third of these causes, without any manifest indisposition, or disorder sufficient to induce the patient to resort to medical advice; but it never appears as the consequence of the other pathological states, unless in the advanced stage of the most dangerous, depressing, or malignant maladies. When the hæmorrhage occurs from the former of these, it is often to a very great amount; but it very rarely is excessive when it proceeds from the latter states. In all, the existence of the extravasation is to be inferred from the presence of the *constitutional symptoms* (§ 25.) usually produced by profuse hæmorrhages. When the states of vital power and of the blood cause sanguineous exudation into the shut cavities, ecchymoses or petechiæ in other parts of the body, and hæmorrhage from mucous canals, are very generally also observed.

275. i. HÆMORRHAGE FROM THE SEROUS MEMBRANES OF THE BRAIN OR SPINAL CHORD very rarely occurs, unless as a consequence of concussions or injuries of the head or spine; or from violent exertion, particularly in warm weather, or under a hot sun. Sanguineous effusion between the membranes may, however, follow the rupture of small superficial aneurisms or varices, and the growth of malignant or other tumours, or the occurrence of ulceration, implicating the membranes. Hæmorrhage in these situations cause apoplexy and paraplegia, or other comatose and paralytic states. I have seen very slight effusion in the spinal canal in a case of tetanus; and Dr. THOMSON observed it in a case of rabies. BONET, MORGAGNI, and OLLIVIER, have seen effusion simultaneously between the membranes of the brain and spinal chord. (See arts. APOPLEXY, BRAIN (§ 26.), PALSY, and SPINAL CHORD.)

276. ii. HÆMORRHAGE INTO THE PERICARDIUM may take place without rupture of the heart or large vessels within the pericardium, although more or less manifest rupture is the most frequent cause. — *Rupture* of the parietes of one or other of the cavities of the heart has been observed by SALZMANN, MORGAGNI, MORAND, PORTAL, CORVISART, LAENNEC, and several others enumerated in the subjoined references. In the larger proportion of these cases, the preexistent lesions which occasionally give rise to rupture have existed. (See art. HEART.) But rupture of the coronary artery (VIRIDET), of the vena cava (WRIGHT), or of one of the pulmonary veins, or of an aortal aneurism, or perforation of the aorta (FIORATI), within the pericardium, may be the source of hæmorrhage. Several instances of these are referred to below. Blood may also be effused, or rather exuded into the pericardium, in greater or less quantity, or mixed with more or less water, without laceration or rupture of any vessel. Cases of this kind have been observed by VATER, BAADER, SANDIFORT, DE HAEN, THOMSON, HOOPER, myself, and others (see references); and occur chiefly in the advanced stages of adynamic, scorbutic, putro-adynamic, or malignant diseases. Sometimes the blood is poured out between the layers of the pericardium, forming sanguineous vesicles or ecchymoses. (MORGAGNI, DE LA FAYE, STOLL.) When hæmorrhage into the pericardium arises from any of the kinds of rupture just enumerated, death generally takes place suddenly; but when it is exuded, as just stated, the already depressed vital power is increased, and the oppressed action of the heart is more slowly abolished by the effusion.

277. iii. HÆMORRHAGE INTO THE PLEURAL CAVITIES has been observed by MORGAGNI, PLENCIZ, CALDANI, STOLL, FRANK, JOHNSON, myself, and others. It most frequently arises from rupture of an aortal aneurism within the thorax. In this case, the blood is effused, in the first instance, into the posterior mediastinum, death seldom occurring until the accumulated blood lacerates this part, and opens the way to suddenly fatal effusion into one of the pleural cavities. The aneurism may be so large as to occasion symptoms which will lead to its recognition; or it may be so small, and attended by so little disorder, as to escape detection, as in the case of Sir DAVID BARRY, an eminent member of the profession. In him, the symptoms before, and the appearances after, death illustrated this procession of the morbid phenomena. Hæmorrhage into the pleural sac may proceed, also, from erosion or ulceration of the aorta (MORGAGNI, PORTAL); from rupture of the pulmonary vein (EICKEN); from rupture of the vena cava (PORTAL); or from rupture, or a varicose state, of some of the veins near the pleural surface (CALDANI, PORTAL, &c.). Hæmorrhage into the thorax is frequently consequent upon fractures of the ribs and wounds; and many of the instances, where it seems to have arisen spontaneously, have been induced or hastened by external injury or muscular exertion. — More or less blood may be *exuded* from the surface of the pleura, in states of very intense inflammation attended by diminished vital resistance, or during the advanced stages of putro-adynamic fevers and of other malignant diseases. But these are comparatively rare occurrences; and the blood effused is seldom pure, but mixed with much serum or watery exhalation; or, rather, the effused serum is more or less deeply coloured by an admixture of red particles.

278. iv. HÆMORRHAGE INTO THE PERITONEAL CAVITY, like hæmorrhages into other serous cavities, seldom occurs, unless as a consequence of external injuries or wounds. It sometimes depends upon rupture of a large vessel, or the laceration of some viscus, especially the spleen, liver, or stomach; but it may proceed from other lesions. BALLONIUS, PORTAL, DANIEL, and others, have recorded instances of its occurrence from rupture of the spleen; a case of which has come under my own observation. AYRAULT mentions an instance in which it arose from ulceration of some of the vessels of this viscus. BLANE found it to proceed from the surface of the liver. When the spleen or liver is engorged or enlarged, after repeated attacks of ague, particularly in warm or miasmatous countries, a comparatively slight external injury, or a concussion of the trunk, may occasion laceration or rupture of either, with extravasation of blood in the abdomen. Hæmorrhage in this situation may arise, also, from operations for strangulated hernia, especially when a portion of omentum has been removed; or from paracentesis in cases of ascites (BELLOCQ), or of encysted dropsy. Rupture of an aortal aneurism, or

of the aorta without any pre-existent aneurism (Ferro, J. P. Frank, James, Arnott, Rose, Hume, &c.), of the vena cava (Bonet, Lancisi), of the vasa brevia (Sandifort), of the mesenteric artery (Ferro), and of the splenic artery (Nenei), with hæmorrhage into this cavity, have been severally noticed. Jenty mentions a case in which rupture of the vena cava seemed to have been favoured by curvature of the spine. Heim traced the hæmorrhage to the ovarian vessels; Palfyn, to the vessels of the omentum; Godelle, to rupture of a Fallopian tube; and Portal, to the mesenteric vessels, in a female who had experienced sudden suppression of the catamenia in one instance, and to the ovarian vessels in another. In cases of tubal or ovarian fœtation, extravasation of blood into the abdominal cavity is a necessary consequence of the growth of the ovum; and it has been observed in such circumstances by Büttner, Heim, Clarke, Painter, myself, and many others. — Osiander met with hæmorrhage into the peritoneal cavity after delivery, that had arisen, in his opinion, from dilatation of the Fallopian tubes. The exudation of blood, or of a bloody serum, from the peritoneal surface occurs only during those morbid states, in which it has been observed to take place into the pericardium or pleura. (See art. Peritoneum.)

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279. XI. Hæmorrhage into the Areolar Tissue, or into the Substance of an Organ, occurs in two forms: — 1st, Confined to a single part or organ; — 2d, Extended to several organs, and more or less diffused. The *pathological states* of which either of these forms may be the result are chiefly the following: — *a*. Increased determination of blood or vascular action; — *b*. Active congestion, or engorgement from increased flow of blood to the part; — *c*. Passive congestion from interruption to the return of blood from the seat of hæmorrhage; — *d*. Softening, or diminished vital cohesion, of the organ in which extravasation takes place; — *e*. Disease of the vessels of the part favouring rupture, &c.; — *f*. Laceration or rupture of an organ from concussions or external injuries; — *g*. Loss of vital tone, expressed chiefly in the extreme capillaries; — *h*. A morbid state of blood; — and, *i*. These last two conditions conjoined. The more limited forms of hæmorrhage into cellular or parenchymatous parts may arise from either, or from more than one, of these pathological states; but the more diffused or extended depends chiefly upon the last three of them. The former may occur primarily, or without any very manifest sign of pre-existent disorder, although such disorder actually exists; the latter is generally the result of very serious and evident disease, especially of scurvy, purpura, putro-adynamic or malignant fevers, &c. — The organs, in the structure of which hæmorrhage most frequently occurs, are the brain and cerebellum, the spinal chord, and the lungs; and those in which it is more rarely observed are the spleen, liver, pancreas, and kidneys. It still more rarely takes place in two or more of these parts at once, unless in the

course of the dangerous constitutional maladies just mentioned. M. ROBERT (*Nouv. Biblioth. Méd.* t. ii. p. 74. 1826) records a case in which he found blood effused in the substance of the brain, lungs, liver, pancreas, and kidneys; but the pre-existent constitutional disorder was characterised by extreme adynamia, manifested especially in the vascular system and circulating fluids.

280. Hæmorrhage into the *areolar tissue*, particularly in those parts of it that possess the membranous form, giving rise to ecchymoses, petechiæ, &c., occur chiefly in *purpura*, *scurvy*, and the last stages of malignant exanthematous and other fevers; and in these diseases hæmorrhage generally takes place, also, from mucous surfaces, and sometimes, likewise, into the substance of one or more organs. In these cases, the blood is dark, dissolved, or deficient in crasis, and incapable of coagulating. The instances of "*Universal Hæmorrhage*" (*Hæm. Universalis*) recorded by several writers of the sixteenth and seventeenth centuries are entirely to be referred to the above maladies, or to a scorbutic, conjoined with a hæmorrhagic, diathesis, generated most probably by the nature of the food and modes of living, and to the putro-adynamic state which exanthematous and typhoid fevers then frequently assumed. (See arts. APOPLEXY, BRAIN, LUNGS, PALSY, PURPURA, SCURVY, &c.)

HÆMORRHOIDS.—SYN. Αἱμοῤῥοις (from αἷμα, blood and ῥοος, a flux), Hippocrates, Galen, Celsus. *Hæmorrhois*, Pliny, Linneus, Sagar, Sauvages, Cullen. *Hæmorrhoides*, Juncker. *Fluxus Hæmorrhoidalis*, Hoffmann. *Proctorrhæa*, Auct. var. *Proctalgia Hæmorrhoidalis*, Macbride. *Marisca*, Good. *Hæmorrhischesis*, Ploucquet. *Hæmorrhœa Vasorum Hæmorrhoidalium*, Swediaur. *Hémorrhoïdes*, *Flux Hémorrhoïdal*, Fr. *Goldaderfluss*, *Hümorrhoiden*, Germ. *Morice*, Ital. *Piles*.

CLASSIF. — 1. *Class*, Febrile Diseases; 4. *Order*, Hæmorrhages (*Cullen*). 1. *Class*, Diseases of Digestive Organs; 1. *Order*, Affecting the Alimentary Canal (*Good*). II. CLASS, II. ORDER (*Author*).

1. DEFIN. — *Pain, tension, weight, heat, or other uneasy sensation, referred to the rectum and anus, accompanied or followed by tumours in these parts, or by a flow of blood from them when the patient is at stool; recurring after intervals, and sometimes periodically.*

2. *Preliminary Remarks.* — There are few diseases upon which so much has been written — ignorantly and dogmatically written — as upon hæmorrhoids. In modern times, the pathology and treatment of this disease have been too generally viewed in a limited point of view, and usurped by persons who have endeavoured to convince the public that they have made it the subject of especial investigation, or even of exclusive study. — Judging, however, from their writings, more mischief than benefit has thus arisen from the mechanical division of labour they have adopted; and not only have they failed in advancing our knowledge as to the nature and treatment of the malady, with which they profess so intimate an acquaintance, but they have actually overlooked, or been ignorant of, the part it occupies in the circle of morbid action, and they have frequently, even when affording temporary benefit by empirical means, or by local or surgical aid, caused most serious consequent mischief. Those affected by this complaint are unable to foresee the consequences that may result from injudicious interference, especially if appropriate medical treatment be not afterwards pursued; and, whilst immediate relief, when procured, is made a matter of high commendation, both by those who receive, and by those who administer it, the remote or contingent bad effects are rarely traced by them to their origin, and are often of such a nature as to terminate all inquiry.

3. Of those who have professed an infallible cure for hæmorrhoids, there have been few who appear, from their writings, to have been acquainted with the nature of the complaint; with the relation in which it often stands to other morbid conditions; with its frequent existence as the more manifest part of a more important and concealed state of disease, and with the most safe and appropriate means of removing it. They have viewed it as a local disorder which is to be cured by local or surgical treatment, and not as a visceral disease often depending upon latent or extensive morbid conditions, to which surgical measures may prove injurious; and for which such measures are at most only occasionally required, and then as adjuvants merely of a strictly medical, and often constitutional, treatment. Owing to an imperfect knowledge of the varieties of hæmorrhoidal tumours, and of their pathological relations — *a.* Fatal hæmorrhage has not infrequently resulted from excising or puncturing them; — *b.* Enteritis, peritonitis, and even internal phlebitis have followed the extirpation of them by ligature; — and, *c.* Fatal diseases of the brain, or of the lungs, or even of the liver, have arisen from the permanent stoppage of a discharge by these means, to which the system had become habituated, and which had warded off these and other serious maladies. This evacuation being arrested by these or other local measures, the safety valve to an overloaded state of the vascular system is permanently closed; and a source of local derivation and of discharge, that had preserved a vital organ from impending disorganisation, is cut off, without either preparing the system for the changes thereby produced, or substituting some other evacuation in its place. Persons who thus extend the division of labour principle to a science which admits not of it with advantage either to the branch which is thus attempted to be cultivated, or to those upon whom it is practised, may reply, that *they* have seen no mischief result from the means they employ; but the mischief in such cases is strictly of a medical nature, is often remote, and falls not within the sphere of those who thus unscientifically and empirically limit the practice of their profession. Division of labour may improve manual dexterity, or may extend mechanical contrivance; but it cannot improve pathological knowledge, nor illustrate the relations or associations of morbid actions, nor lead to truly scientific, and safe, and appropriate, and permanently beneficial, modes of cure.

4. I. PATHOLOGICAL HISTORY OF THE DISEASE. — The term *hæmorrhoids*, signifying, literally, a flow of blood, was made use of by HIPPOCRATES; and, down even to the present time, has been applied to a dilatation of the veins at

the extremity of the rectum, accompanied with a flow of blood; and the vessels of this part have been consequently called the hæmorrhoidal vessels. Many of the ancient and of the older writers have extended the term, not only to every complication of this complaint, but also to hæmorrhages from natural outlets; and thus hæmorrhoids of the uterus, of the bladder, and of the mouth, have been frequently used to denote hæmorrhage from these parts. Since the time of Morgagni the term has been applied indifferently to that morbid condition which was generally attributed to dilatation of the hæmorrhoidal veins, and to hæmorrhage from the rectum, although some authors have endeavoured to restrict it to one or other of them. But as the tumours and the flow of blood, whether appearing separately or in conjunction, arise from the same source; I shall consider them as varieties of the same disease. It will, however, be shown that the hæmorrhoidal tumours consist of different kinds or modifications of structural lesion, and that either of them may take place independently of, as well as in connection with, a discharge of blood from the anus.

5. i. *General Character and Symptoms of Hæmorrhoids.*—The first attack is usually slight, and often attended by little constitutional disorder. Slight pain, heat, weight or fulness, are felt at the extremity of the rectum, or about the sacrum, sometimes extending to the perinēum, with obscure tenesmus or pain at stool, often with costiveness, and occasionally with an irregular or irritated state of bowels. The sensibility of the bladder or urethra is frequently also increased. After a short time, or in two or three days, at most, a slight flow of blood, generally of a bright colour is observed with the fæces, or smearing their surface. In some persons this flow does not take place, particularly in early attacks; but when it does, it is usually critical, and all the symptoms subside. When this discharge does not occur, as well as very frequently when it does, one or more tumours, of varied size, begin to appear within or at the verge of the anus. These tumours are preceded by a stinging or pricking pain, which increases as they enlarge; or are compressed by the sphincter ani. Sometimes blood oozes from their surface, or is squirted out through small apertures when at stool. Occasionally they remain dry, or are moistened by a colourless serum; but, in either case they collapse, after a short time, and entirely or partially disappear.

6. After a longer or shorter interval the same train of symptoms returns, generally in a greater degree, and acquires increased severity by the repetition. The pains are more acute, especially when sitting, standing, or walking; and often extend down the insides of the hips and thighs; the blood is discharged in greater quantity; and the tumours, if they have previously been developed, become larger or more numerous. Subsequently, when they collapse, and particularly when they have been often distended, they present so many flaps of skin, and when external form a serrated margin to the anus.

7. In irritable or weak persons, especially when the complaint is simple or primary, is severe, or returns often, the local alteration affects more or less the general health. Frequent chills, or coldness, alternating with flushes, dryness of the mouth, hardness or frequency of pulse, costiveness, pallor of the countenance, and other febrile symptoms, are complained of. The functions of digestion are also more or less deranged, and the bowels are either costive, or irregular, especially when the complaint is dependent upon disorder of the hepatic organs. When it is associated with disease of the lungs, the symptoms referrible to the chest are generally materially alleviated by it, especially if it be attended by sanguineous discharge; and a similar result follows its occurrence in plethoric persons liable to headachs, or to congestion of the brain or liver. In all cases, however, care should be taken not to mistake the constitutional disorder, or the affection of remote organs, often occasioning the disease, for sympathetic disturbance preceding the hæmorrhoidal attack. A minute examination of the relation of the complaint with other ailments should always be instituted, before the indications of cure are determined upon.

8. Such is the usual course of hæmorrhoidal attacks; but the sense of weight, heat, fulness, or constriction, with more or less pain about the anus, and slight constitutional disturbance occasionally occur without either effusion of blood or the formation of tumours, even in old cases; and the hæmorrhage sometimes takes place without the tumours, but seldom without being ushered in by the other symptoms. Indeed, in all cases, indications of congestion, or of increased action of the vessels of the part are present in some degree, these states of the vessels constituting a principal feature of the complaint. Both the local and constitutional symptoms, and the structural lesions, show, that increased determination of blood to the extreme vessels of the part, in most cases, and impeded return of it from them, in others, are the chief pathological conditions of the disease.

9. ii. *Of the Hæmorrhoidal Tumours.* — The nature of these tumours was not understood until lately. They were usually distinguished into *internal*, and *external*, and into *bleeding*, and *blind*, piles, according to their situation in respect of the verge of the anus, and to their connection with a sanguineous discharge. But most of the older writers and many of the moderns, and amongst the latter the Bells, Home, Baillie, Cooper, &c., imputed them to dilatation of the veins. More correct views as to their structure were entertained first by Le Dran and Richter, perhaps also by Cullen and Abernethy; and more certainly by Chaussier, De Larroque, De Montègre, Calvert, and Colles. From my own observations, as well as from the researches of these and other pathologists, hereafter referred to, there are *three kinds* of hæmorrhoidal tumours, differing essentially both in their structure and appearance. — *a.* The *first*, or most common kind is first seen in the form of fleshy tubercles, of a brownish or pale red colour, situate within the anus, or descending from the rectum. They have a somewhat solid or spongy feel; and, when divided, they present a compact or porous, and bloody surface. As the blood oozes from the cut surfaces, they become pale and flaccid. When the tumours are *external*, they are paler and more elastic; are infiltrated by serum; and are sooner produced, and disappear more readily, than when they are *internal.* — In

either case, they often contain a central cavity filled with fluid or coagulated blood, of a dark colour. This cavity is either smooth or granulated, and minute vessels may be traced into it; Mr. Calvert states that it has no direct connection with any larger vessels. It is usually small; generally about the size of a pea, but sometimes that of a bean, or walnut, or even larger. More frequently, however, there is no regular cavity or cyst; the substance of the tumour being as if infiltrated with blood, which becomes coagulated and dark: but this appearance is not owing to extravasation, but rather to dilatation of a number of small vessels which traverse the tissue in the direction of the axis of the rectum, as, upon dividing the part longitudinally, numerous dark streaks are seen in its substance, whilst a section made transversely shows only small roundish specks.

10. The patient is usually made sensible of the development of these tumours, by a peculiar pricking or stinging sensation, within or at the margin of the anus; and one or more are found slightly elevated, or pressed downwards by the sphincter. The increase of these tumours takes place more by elongation than by expansion, and they assume a conical form, and are larger than their necks. Sometimes blood is exhaled from their surface; in other cases, or on other occasions, a serous fluid is exuded; and occasionally they are entirely dry, especially when they are external. In either case they generally disappear in two, three, or four days; but return again at an uncertain or at a regular period, and increase in size, becoming firmer in texture. After some blood is evacuated from them, or after the determination of blood to the parts has ceased, they collapse, leaving small pendulous flaps of skin, which ultimately disappear if the tumours have been small; but if they have been large, these flaps continue conspicuous, and give a projecting and irregular margin to the anus. Having been strangulated by the sphincter, or repeatedly engorged with blood or lymph, or chronically inflamed, these tumours become more solid and almost permanent, are a source of constant discomfort, and give rise to several of the consequences and complications about to be noticed (§ 20.).

11. The permanent state of the tumours is owing partly to the development of capillary vessels, and partly to the effused blood and lymph becoming organised; this latter circumstance especially giving rise to the excrescences, or irregular mass of tumours found around the anus in those subject to hæmorrhoids. — Occasionally the tumours acquire a very great size, arising from the effusion of much blood in the central cavity, and of blood and lymph in the cuticular envelopes. Instances of the enormous size of these tumours have been recorded by Schmucker, Calvert, and other writers about to be referred to.

12. *b.* Hæmorrhoidal tumours *formed by a varicose state of the veins* of the rectum are not so common as those just described. They seldom attract attention until they have made some progress, for the distension takes place very gradually, without causing much sympathetic disturbance, or materially increasing previous disorder. They are not so disposed to enlarge at particular periods, and are more permanent and less painful than the form already noticed. They are commonly of a dark or bluish colour, and soft and elastic to the touch. When compressed by the finger they become sensibly less, but return to their former state when the pressure is removed. They are round and broad at the base, and often distributed in irregular or ill-defined clusters. They evince little disposition to bleed, unless when ruptured or injured. They appear crowded together, extend up the rectum, are more or less internal, or become external chiefly during costiveness, or when the patient is straining at stool, or after a fæcal evacuation; whilst the former kind is limited, and generally external, or within the reach of the finger. Valsalva, Ludwig, Petit, Richerand, Begin, Calvert, and others, have seen hæmorrhoidal varices extend upwards along the rectum to the colon, especially in persons who had experienced obstruction of the portal circulation. M. Begin observes that, in most cases, the dilated superficial, submucous, or subcutaneous veins are only the smaller part of those surrounding the rectum. Sometimes the lower part of this intestine appears as if plunged in the middle of a network of dilated and engorged veins, forming a thick vascular ring, the incision or puncture of which may give rise to dangerous hæmorrhages. M. Richerand found, upon dissection, those varicose tumours filled with clotted blood, and their interiors continuous with those portions of the veins which retained their usual size. These dilated vessels presented alternately a state of distension and their natural calibre; and were continued in every direction, forming a plexus around the outlet of the bowel, the dilated portions being covered only by the thinned mucous membrane.

13. As the varicose tumours arise from many of the causes that produce the preceding form (§ 9.), and as both varieties occupy nearly the same situation, it may be reasonably inferred that they may exist together, or that the latter may often give rise to the former in connection with it. Now this is sometimes the case; inflammatory irritation, supervening in the course of the varicose form of the disease, superinducing the *mariscæ*, or the first variety of tumour, and thereby obscuring the varicose character of the former. Or a different procedure, as Mr. Calvert supposes, may take place; the veins becoming dilated in consequence of the previous formation of the cellular tumours. These complications of the tumours can be ascertained only by a careful examination, and by attention to the history, progress, and symptomatic relations of the case.

14. *c.* A *third form* of hæmorrhoidal tumours, of an *erectile* character, was first noticed by Sir James Earle, and more particularly described by Mr. Colles. These tumours are of different sizes; are soft and spongy to the touch, of a purplish colour, with a number of minute, but distinct, vessels on the surface of each. One, two, or more of these tumours protrude through the anus when the patient is at stool. Early in the disease the protruded parts retire spontaneously; but, in advanced stages, they require to be replaced by the hand. Alvine evacuation is followed by pain, which, especially when the disease is prolonged, does not cease for two or three hours; and is attended by losses of blood,

which sometimes occasion exsanguine exhaustion; the *sphincter ani* becoming wide and relaxed, and the tumours protruding. Dr. COLLES states that, on examination after death, he found bloodvessels as large as crow-quills, running for some way down the intestine, and then dividing into a number of branches; each of these vessels ramifying profusely, and each forming, by the interlacing of its numerous branches, one of these erectile or vascular tumours. The trunks and branches of these vessels were covered only by the lining membrane of the intestine.

15. iii. *Of the Hæmorrhoidal Discharges.*— *A.* The ancients believed the blood to be discharged from the tumid extremities of the hæmorrhoidal veins. MORGAGNI found these veins more or less dilated in several cases, and it was very generally considered that the blood oozed through, or proceeded from rupture of, these vessels. The investtigations of modern pathologists have satisfactorily shown that the hæmorrhage may arise from various sources: — 1st, From congestion of the vessels of the part followed by exhalation or exudation from the internal surface of the rectum; — 2d, From irritation of this bowel, followed by vascular determination and sanguineous exhalation; — 3d, From the surface of the hæmorrhoidal tumours, especially those belonging to the first and third varieties; — and, 4th, From the rupture of varicose or enlarged vessels. When the blood proceeds from the *first* or *second* of these sources, it may be seen to exude from the surface of the protruded portion of bowel; and the discharge generally removes all the symptoms characteristic of the complaint. It is also frequently preceded, and followed, by an exhalation of a serous nature, from the same source. Hæmorrhage, in connection with the common form of tumour, may arise from exhalation from its surface; or from the contraction of the sphincter forcing blood, in a fine stream, from one or more points of it; or from exhalation from the adjoining mucous surface, in consequence of congestion of, or of sanguineous determination to, the affected bowel. Where the vascular or *erectile* tumours exist, blood is always discharged, and uniformly from their surface. The *varicose form* of tumour is less frequently attended by hæmorrhage than any of the others. When the blood proceeds from the rupture of enlarged or varicose vessels, it generally flows in a stream whilst the patient is straining at stool, the flow increasing or returning when this effort is repeated. The passage, also, of hardened fæces over the congested or inflamed mucous surface of the rectum, or over the tumours developed beneath this surface, or over the enlarged or distended vessels, may lacerate or injure them in such a manner as to be followed by hæmorrhage, but in such cases the discharge is usually slight.

16. In many cases, the blood flows for a short time only, and is not again seen until the next attack. But in others, it is observed repeatedly when the bowels are acted upon, or the discharge is renewed when the fæces are expelled, for several days. It is generally of a red colour, and either covers, or follows, the fæcal evacuation; but when it is consequent upon venous congestion or dilatation, it is of a dark hue, and follows, or is partially mixed with, the fæces.

17. *B.* The *returns and amount of the hæmorrhoidal discharge* are extremely various; but in many instances a periodical return is observed in both males and females. In females, the hæmorrhoidal, not infrequently takes the place of the catamenial discharge, especially at the age when the latter usually ceases, and assumes a periodic form. In some instances, these evacuations alternate. When the morbid action has once commenced in this part of the body, it being favoured by peculiarity of structure and by several pathological relations (§ 30.), there is always a predisposition thereby formed to the recurrence of it; and the same causes still operating, it at length becomes habitual, and even necessary to the prevention of more serious maladies. It has been satisfactorily shown by observation that, as long as the causes of hæmorrhoids continue, the evacuation attending them is a wholesome occurrence, inasmuch, as an overloaded state of the vascular system, that would otherwise induce dangerous visceral disease, is thereby removed. In all cases, therefore, when hæmorrhoidal affections depend upon constitutional causes, or are connected with any indications of visceral disease, or have existed for a considerable time, their return should not be prevented, unless other sources of discharge, or other sanguineous evacuations are substituted for them: but, when they proceed from causes which are chiefly or entirely local, neither the vascular system nor constitution, nor any important internal organ manifesting disorder, a more active interference may be attempted; although even then with caution, especially if there be any tendency to vascular plethora, and if the principal causes of the disease are still in operation.

18. The *quantity* of blood lost in each attack may be very trifling — may not exceed a drachm or two; or it may amount, at one time, to several pounds. Instances are adduced by RHODIUS, FERNELIUS, LANZONI, HARRIS, SPINDLER, MOEHRING, HOFFMANN, EARLE, CALVERT, and others, in which the quantity discharged seemed enormous. Mr. CALVERT supposes that the vessels in such cases are in a state of extreme excitement: but this is by no means a correct inference; as, in most cases of excessive discharge, the hæmorrhage is passive or venous, or is consequent upon congestion, or upon interrupted circulation through the hæmorrhoidal vessels. The evacuation more commonly is excessive from its frequent return, than from its quantity at any one time; and it not infrequently induces a state of exsanguine exhaustion, requiring the most decided interference.

19. *C. A colourless Hæmorrhoidal Discharge — Mucous or serous Hæmorrhoids (H. mucosæ vel serosæ)* of Authors; *Hémorrhoïdes blanches*, BEGIN; *Medorrhœa Ani*, J. P. Frank — sometimes takes place, and either follows the discharge of blood, or attends the hæmorrhoidal tumours, especially those belonging to the first variety. It varies much as to quantity and appearence. It is either watery or mucous; or resembles a weak solution of gum; or it is albuminous and like the white of egg. When watery, serous, or mucous, it usually exudes slightly from the anus; when more abundant or albuminous, it is commonly passed at stool. In cases attended by much heat and irritation about the anus, a colourless exudation, consisting chiefly of an increased secretion from the follicular

glands of the part takes place. These varieties of colourless discharge are most frequent when there is little or no hæmorrhage, and when the disease is associated with *ascarides*, or with *leucorrhœa*, or with *pregnancy*.

20. iv. *Of the Consequences and Complications of Hæmorrhoids, local and constitutional.* — *A. Inflammation* is one of the most frequent morbid associations of hæmorrhoids. It is attended by more or less swelling and redness of the lower part of the rectum and anus; by throbbing and by increased sensibility and heat, aggravated by the passage of fæces. The sanguineous discharge is slight or absent; but if it become abundant, the symptoms subside. A mucous discharge is, however, not uncommon. Sometimes the inflammation is severe, and implicates not merely the mucous membrane and subjacent cellular tissue, but also in a slighter degree the prostate gland and neck of the bladder, occasioning much pain in the perineum, sacrum, &c., with dysuria, or even strangury. The irritation may even extend to the womb in females. The tumified state of the lower part of the intestine in these cases, together with the inflamed tumours, and the spasmodic constriction of the sphincter, produces obstinate constipation and straining or tenesmus. Not infrequently the protrusion of the tumours, when internal, with a portion of the mucous membrane, follows the action of the bowels, and the inflamed tumours, being strangulated by the sphincter, become remarkably painful, or even ultimately slough. With the severity of the local symptoms, the constitution generally sympathises; and febrile symptoms are developed, particularly in irritable or nervous temperaments.

21. *B. Fissures or rhagades of the anus* are not uncommon in cases of hæmorrhoidal tumours. They may commence in small longitudinal ulcerations; but they more frequently seem to take place as follows:—When the tumours are large and numerous, hardened fæcal matters, in passing forcibly between them, crack or slightly tear them at their bases, the chronic inflammation in this situation hardening and rendering the tissues less yielding to any distending power. These fissures are most apt to occur when the tumours are situated upon the sphincter. They are usually slight at first, but they enlarge, owing to the frequent operation of the causes that produced them and to the lodgment of fæcal matters, and occasion great pain, which continues for some hours after each stool, and spasmodic constriction of the sphincter. Herpetic or other chronic eruptions sometimes also appear about the anus, and favour the supervention of these fissures, by rendering the surface harder and less capable of distension, or by diminishing its vital cohesion. Fissures of the anus mostly occur as a consequence of the first and third variety of hæmorrhoidal tumour.

22. *C. Ulceration or abscess, frequently passing into fistula*, often follows hæmorrhoids, particularly when inflammation occurs. When the inflammation is superficial, affecting chiefly the mucous membrane, it gives rise to ulceration in one or more points, especially in the situation of the tumours; and it may penetrate deeply, or be followed by small abscesses, either in these tumours or in their vicinity. When the inflammation is more deeply seated, implicating the cellular and adipose tissues, an abscess then forms very readily and often rapidly. Pain, tension, and heat about the anus are then severe, and with the throbbings, extend up the pelvis. When the abscess is anterior to the anus, and presses upon the urethra, and parts adjoining the neck of the bladder, the suffering is very great, and sometimes is attended by strangury or total retention of urine. The abscess, in the female occasionally extends to one of the labia, or even breaks into the vagina, or passes into fistula in that, or in an adjoining situation. Of this I have seen several instances. — (See art. Rectum.)

23. *D. Hæmorrhoidal tenesmus, or spasmodic constriction of the sphincter, frequently with protrusion of the mucous coat of the rectum*, is a common complication of hæmorrhoidal affections, particularly when the tumours are inflamed, or when there are fissures between them (§ 21.). If the tumours are seated within, or above the sphincter, or if the mucous or submucous tissues are much tumified or infiltrated by inflammatory determination, the actions of the parts of the bowel above this, or the efforts at expelling fæcal matters, are attended by much tenesmus and often cause a protrusion of the tumours and tumified parts, sometimes to the extent of partial invagination of the rectum. When the sphincter is spasmodically constricted, in consequence either of the irritation of the internal surface of the intestine, or of fissures in the anus, the veins are grasped so firmly by it as to give rise to a congested or varicose state of those external to, or below, the constriction, and the disease is thereby aggravated and prolonged. This irritable or spasmodic state of the sphincter may exist in nervous persons, without fissure or inflammation, and be attended by great pain, as shown by M. Dupuytren; but it most commonly is associated with one or both of these morbid states, as well as with a bloody or colourless discharge, and with hæmorrhoidal tumours, or with either of them only.

24. *E. The pain of hæmorrhoids* varies in character in different cases. In some it is constant; aggravated upon passing a motion, and is attended by heat and throbbing: it is then owing chiefly to inflammation. In others it is intermittent, extremely severe at times; comes on and ceases suddenly; is eased by pressure; and is of a nervous character. This kind of pain is often connected with spasmodic constriction of the sphincter, and was denominated *proctalgia* by Sauvages. The pain is often also connected with fissure, as shown by Boyer, Merat, Montègre, and others; and is then pungent, lancinating, cutting, lacerating or peculiar, and greatly aggravated by the action of the bowels. In many cases, the pain extends to the insides of the hips and the back of the thighs, or to the urinary organs and urethra; and occasionally up the pelvis into the abdomen. Indeed *colicky pains*, often of a severe kind, usher in an hæmorrhoidal attack, as well as supervene in its course, or upon certain modes of curing it, as upon the application of ligatures on the tumours.

25. *F. Irritation or inflammation of the neck of the bladder and prostate*; painful affections of these parts of the urethra, and of the vesiculæ seminales; difficult or painful micturition; retention of urine; and prolapse of a portion of the rectum; are not infrequent complications of

hæmorrhoids. *As more remote consequences* of the disease, may be mentioned, fistula in ano, recto-vaginal fistula, induration and thickening of the surrounding cellular tissue, permanent stricture of the rectum, and chronic or constant prolapsus ani. These, and some other organic lesions con-consequent upon hæmorrhoidal attacks, are fully described in the article Rectum.*

26. II. Diagnosis. — *a.* Hæmorrhoids may be confounded with *Intestinal* Hæmorrhage (§ 185.); but in that disease the local symptoms and lesions characteristic of hæmorrhoids are not present in a prominent or primary manner; nor can a varicose state of the vessels, nor any other form of tumour, be detected upon examining the rectum with the finger. Besides, intestinal hæmorrhage is more generally a symptom of an acute or dangerous visceral disease, and more frequently appears in the advanced stages of adynamic or other fevers, or as a symptom of non-febrile cachexia, than the hæmorrhoidal discharge, whilst this latter is more commonly the principal and most manifest, if not the primary, affection. It may, however, sometimes happen that a patient subject to hæmorrhoidal affections is seized with low fever; or with remittent or simple fever, complicated with congestion or obstruction of the liver, with or without jaundice; and hæmorrhage from the bowels supervenes. The question is, whether, in either of these cases, the blood is discharged from the testinal mucous surface (see arts. Fevers (§ 474.), and Hæmorrhage (§ 185. 196.)), or from the hæmorrhoidal vessels or tumours (§ 15.). These are not uncommon cases: I have seen several. A fatal instance of this kind occurred in my practice whilst writing this article. The diagnosis is of importance, as the prognosis and treatment are both affected by it. If pain, tumours, or other symptoms referrible to the rectum or anus, are present; if they be increased by the action of the bowels, and the blood discharged at that time appear fluid and recently extravasated; and if an examination of these parts, as far as it can be accomplished, show the presence or increase of hæmorrhoidal disease; then the hæmorrhage proceeds from it: but if the blood be clotted, very dark, mixed with the secretions or fæces, or consist of small coagula, the calls to stool not being attended by any distress, the source of the discharge is above that which is the seat of hæmorrhoids, and the examination post mortem will show the accuracy of the inference.

27. *b.* Hæmorrhoidal *tumours* may be confounded with *fungous* or *polypous* tumours or excrescences of the rectum or anus; but these latter enlarge progressively; their surfaces are indolent; and they rarely give rise to hæmorrhage, or to paroxysmal attacks resembling hæmorrhoids, or to inflammation of the adjoining parts. *Venereal excrescences* about the anus may be ascertained by the history of the case, by their development exteriorly to the rectum only, and by the morbid appearance of their surface. The slightest observation, and the least experience, are sufficient for the diagnosis in these cases.

28. III. Causes. — *a.* The *antecedent* or *predisponent causes of hæmorrhoids* are temperament, and constitution, age, sex, climate, and modes of living. Persons of a melancholic, bilious, or sanguineo-bilious temperament, of a plethoric habit of body, and with a veinous system prominently developed, are most liable to this disease. The remark of Stahl, that "subjectis accidere solet facilius hic fluxus sanguineo-cholericis, et sanguineo-melancholicis plethorâ affectis," is very near the truth. Owing to this predisposition, the complaint is often *hereditary*, as fully shown by Holler, Alberti, Larroque, Montègre, and others. It is most common in mature *age*, when the abdominal viscera are in a state of greatest activity, and the vascular system most plethoric, and, consequently, when these viscera are most liable to disorder and to vascular determination. When it occurs in early puberty, or soon afterwards, it is chiefly owing to the determination of blood to the vicinity of the rectum, often favoured or induced by excessive venereal indulgences. Hæmorrhoids seldom appear before puberty; and yet I have seen several instances of it in children. I very recently prescribed for the disease in a boy of five years. Trnka, Alberti, and many of the authors referred to, adduce similar cases, most of which they impute to hereditary disposition. Authors differ as to its greater prevalence in *males* or in *females*. Much depends upon the circumstances in which the latter are placed; but it is more frequent in females about the period of the cessation of the catamenia, and afterwards, and during pregnancy, than at any other time; and these and other circumstances may render it almost, if not quite, as frequent in them as in males. M. Montègre supposes that it is more common in females in an accidental or occasional form, and in males in a regular or constant manner.

29. Climate has some influence in disposing to the complaint. Warm, moist, and miasmatous climates are much more favourable to it than those which are dry, cold, or temperate. The former develope the bilious, melancholic, and choleric constitutions, relax the veinous system, and favour obstructions of the abdominal viscera — changes most conducive to hæmorrhoids. Much, however, will depend upon the *modes of life*, the *manners*, and the *morals* of the inhabitants. — *Habits of life* exert the greatest influence in causing

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* M. Montegre has given the following classification of hæmorrhoidal complaints: —

1. *Blind or dry Hæmorrhoids* (*Cœcæ*).		
2. *Hæmorrh. with Discharge* (*Fluentes*) - -	White Discharge (*Albæ*), with Catarrh of the Intestines.	
	Sanguineous Discharge (*Sanguinolentæ*) -	By Exhalation. By Rupture.
3. *Hæmorrh. with Tumours* (*Tumentes*) -	Varicose (*Varicæ*) - -	Dry. Bleeding.
	Mariscous (*Mariscæ*) - -	Dry. Bleeding from dilated Pores.
4. *Painful Hæm.* (*Dolentes*) -	Inflammatory. Nervous. Fissured.	
5. *Hæmorrh. with Constriction of the Anus* (*cum Contractione Ani*)	Indolent. — From Induration of the Tissues.	
	Painful - -	Spasmodic. Schirrous.
6. *Hæmorrh. with Ulceration* (*Ulceratæ*) - -	Superficial. Fistulous.	
7. *Hæmorrh. with Prolapsus* (*cum Procidentia Ani*)	From allongation of the internal Membrane. From Invagination of the Intestine.	
8. *Hæmorrh. with Irritation of the Bladder* (*cum Irritatione Vesicæ Urinariæ*) -	With Dysuria. Strangury. Hæmaturia.	

the disease. Sedentary occupations, and indolence with luxurious nourishment, must, as Dr. J. JOHNSON remarks, either find some outlet to the superabundant fluids, or bring on a train of diseases. Hæmorrhoids and gout are the common consequences of this state of things. Many people who have led an active life for many years, on leaving off business and indulging in repose, become, for the first time, affected with piles. The sitting posture, retained for many hours in succession or habitually, particularly on warm or soft cushions; full or rich food; heating or stimulating diet, and intoxicating beverages; inordinate excitement of the sexual organs; habitual constipation, and the use of warm or irritating lavements, and strait corsets, not only predispose to, but often also directly produce this complaint. It is owing to the association of several of these causes that piles are so common amongst persons occupied at the desk, and amongst tailors and shoemakers, as well as among the inhabitants of Turkey and of other eastern countries. It has been very often remarked, that hæmorrhoids are more prevalent in spring and summer than in winter; and this appears to be the case. A disordered state of the alimentary canal and of the liver, and the suppression of other discharges, have a great influence in favouring an attack.

30. *b.* The *occasional exciting causes* are — 1st, Whatever inordinately excites the rectum and lower part of the colon, particularly too large or too often-repeated doses of calomel, aloes, colocynth, black hellebore, camboge, or scammony; occasionally, also, of rhubarb, the neutral sulphates, and of any other purgative injudiciously prescribed or exerting a drastic action; the passage of acrid bile; the irritation caused by worms; many of the substances said to be emmenagogue; all the preparations of mercury in large or frequent doses; the liquor arsenicalis when thus employed; and the inappropriate use of chalybeates; — 2d, Whatever prevents the return of blood through the hæmorrhoidal veins, as constipation, the lodgment of hardened fæces in the rectum or lower parts of the colon, and repeated efforts at evacuation; torpor, congestion, or structural lesions of the liver, and obstructed circulation through the portal system; the pressure of a pregnant, enlarged, or displaced uterus, or of a diseased ovarium; and disease of the prostate or sphincter ani; — 3d, Whatever excites and determines an increased flow of blood to the sexual and urinary organs, as venereal excesses, spirituous liquors, the irritation of calculi, of cantharides, &c.; — 4th, External irritation of adjoining parts; prolonged walks in hot weather; riding in coaches, or on horses or mules without a saddle, — "Nam solet a nudo surgere ficus equo" (MARTIAL, l. xiv. epig. 86.); and the frequent application of leeches to the anus; — and, 5th, The local influence of cold or warmth, as sitting on the ground, or on stone seats or on damp cushions, and the habit of standing with the back to the fire. — Besides the foregoing, various other circumstances occasionally cause this complaint, as the more violent mental emotions, both exciting and depressing; errors of diet and of regimen; inordinate excesses of any kind; and diseases of other organs, particularly those of the lungs or liver. Hæmorrhoids are, moreover, sometimes *critical* in other maladies, especially in fevers and in inflammations of the brain, or of any of the viscera lodged in the thoracic and abdominal cavities. Owing generally to the association of several of the above causes, this complaint is very common in the upper classes of society, in both its simple and more complicated states; and hence the number of treatises which have appeared on it and its consequences.

31. IV. PROGNOSIS. — A favourable opinion of the result may generally be entertained in all the simple states of this affection, particularly when the patient is not far advanced in life, when the constitution is not in fault; and when the lungs, the liver, and brain present no tendency to disease. In other circumstances, and when the complaint is periodic, the removal of it, however cautiously effected, may be followed by serious effects, and especially by diseases of the lungs. (See § 3. 30.) In all cases, the prognosis should be founded upon a knowledge of the causes, of the form, and of the complication of the disorder. If the causes be not obviated, either the disease will return after a time, or it will be followed by a more serious malady. The extent and frequency of the discharge must always be taken into account as well as the form of hæmorrhoidal tumour. The more common variety of tumour is seldom attended by any risk, unless in the circumstances just alluded to, or when otherwise complicated, locally or constitutionally. But the varicose tumours require a more cautious or reserved opinion; for, under the most judicious management, the more prominent or distended parts of the vessels may burst by a thinning process, and occasion profuse hæmorrhage. They are, also, generally connected with more or less visceral disease or constitutional disorder. The prognosis should not be materially different from that just stated, when the complaint is complicated with *inflammation*, for some one of its terminations, as abscess, ulcerations, or fissures between the tumours, fistula, spasm of the sphincter, prolapsus or invagination of a portion of the bowel, and even permanent stricture of the rectum, may take place, however judicious the treatment may be, and occasion very great or prolonged suffering, if not imminent danger. When the complaint is connected with visceral disease, and especially with pulmonary disease, the opinion should be formed chiefly with reference to this association; and the hæmorrhoidal affection should be so managed as to prove a derivation from the internal malady, and to prevent its increase.

32. V. TREATMENT. — *A. The propriety of suppressing the hæmorrhoidal discharge* ought always to be considered when entering upon the treatment of it. CULLEN erred egregiously in considering the complaint as generally local, and in recommending a local treatment; and in this he has been too closely followed by surgical writers. This practice, as Dr. J. JOHNSON observes, of removing the disease as speedily as possible, is very well in sound constitutions; but where there is any defect in the system, or organ predisposed to disease, we should be careful in avoiding the sudden stoppage of the hæmorrhoidal movement or discharge. HIPPOCRATES observed that this complaint often protected the system from other maladies; and a similar opinion

has been offered by STAHL, HOFFMANN, ALBERTI, ROSEN, RICHTER, and others. This is especially applicable to persons who are liable, hereditarily or otherwise, to gout, consumption, apoplexy, palsy, or other kinds of hæmorrhage. Mr. HOWSHIP states that a gentleman, subject to periodic hæmorrhoids, was induced by a quack, and in opposition to the regular opinion, to have recourse to a strong vitriolic wash. This cured the discharge; but the patient died soon afterwards of gout in the stomach. M. MONTEGRE adduces proofs of a number of diseases having been produced by the suppression of piles; the most common of these being fevers*, hæmorrhages, inflammations of the lungs or pleura, phthisis, apoplexy, and various other internal and organic maladies. Mr. CALVERT saw gastric fever follow the application of cold water to the anus for hæmorrhoids. I was lately consulted in a case of apoplexy consequent on the stoppage of the discharge; and, some years since, in a case of fever, and in another of melancholy, from this cause.

33. *B. Constitutional Treatment.* — The oftener the hæmorrhoidal attack is renewed, the more liable will it be to recur, and the greater will be the risk of effecting a sudden cure. On this account it is most desirable to ascertain the causes of the complaint, and to remove them, as being most necessary not only to the efficacy but also to the safety of the treatment. Piles being among those diseases which it is sometimes dangerous to cure, care should be taken to distinguish those which ought, from those which ought not, to be removed. M. MONTEGRE justly remarks, that those which are of a constitutional nature, or which the constitution, as it were, requires, are generally of long standing — sometimes from youth; or they replace some serious or habitual affection: they are hereditary, attended by well-marked indications of plethora — take place from various and opposite exciting causes, or without any obvious cause — are preceded by constitutional symptoms — are succeeded by an improved state of health, whether there be discharge or not — and, finally, are accompanied or followed by inconvenience when interrupted or suppressed: all these circumstances indicating a constitutional disorder which it is dangerous to meddle with too rashly. When hæmorrhoids are more strictly accidental, the symptoms and occasions of their appearance are different from the above, and they may be subjected to more active treatment. But even these become, after frequent repetition or long continuance, habitual to the system — often a safety valve to the circulation, and require a constitutional and cautious treatment. In most circumstances, however, of the disease, strict attention to diet, and to the state of the excretions, with stomachic or deobstruent laxatives, when there is any tendency to constipation; and with cooling diaphoretics when there is any febrile movement present, will be productive of benefit. When the secretions and excretions from the bowels are deficient, a few grains of blue pill, or of hydrargyrum cum creta, with one of ipecacuanha, and five or six of extract of taraxacum or of soap, should be taken at bedtime, and a draught, with equal parts of the compound infusions of gentian and of senna, the next morning, or a teaspoonful of either of the electuaries in the *Appendix* (F. 82. 89. 98. 790.), at night. When constitutional irritation exists, the camphor mixture, and solution of the acetate of ammonia, may be given with sweet spirits of nitre, and the inspissated juice of the sambucus; or the infusion of the tilea Europea with the subcarbonate of soda or of potash, with the extract of taraxacum. The nitrate of potash may also be given with the electuary, or in a diaphoretic or diuretic mixture. When the complaint is connected with vascular plethora, the treatment should be based upon this circumstance; and a spare farinaceous diet, an open state of all the emunctories, and regular exercise, ought to be enforced. If these be neglected, the suppression of the discharge may be followed by some one of the maladies alluded to above. In other respects, the treatment should be directed according to the peculiarities and complications of the case, as shown in the sequel; and organs evincing a tendency to disorder ought to be protected, either by allowing the hæmorrhoidal complaint to proceed, or by increasing it (§ 47.) when it is insufficient for this purpose, or by establishing other sources of irritation or of evacuation.

34. *B. Treatment of the Hæmorrhoidal Discharges.* — *a.* While the *sanguineous discharge* is moderate, returns after considerable intervals, and leaves no unpleasant effects, it is only a salutary adjustment of the constitution, attended, it is true, with inconvenience, but with more than counterbalancing advantages. When, however, it becomes excessive, it ought immediately to be restrained. Its excess should be inferred rather from the effects than from the quantity; for some persons will lose large quantities of blood, almost daily for some time, and yet be otherwise in good health. But, whenever the discharge is followed by pallor, debility, syncope, or convulsions or spasms, it ought to be arrested. Like other *hæmorrhages* (see the art. § 35, 45. *et seq.*) it may be either *active* or *passive*; and the treatment should be directed accordingly.

35. *a.* In the *active form*, vascular determination should be diverted from the rectum, by quietude and the horizontal position; by bleeding from the arm when the pulse admits of it; and by cooling drinks and diaphoretics. If these do not succeed, cupping-glasses, with or without scarificators, according to the state of the system, may be applied over the hypochondria, as advised by the ancients, or upon the loins or sa-

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* A gentleman, between fifty and sixty, who had suffered long from hæmorrhoids and prolapsus of the mucous membrane of the rectum, had remained free from the complaint for a considerable time, in consequence of using cooling astringents, &c. locally, as advised by a person who had derived benefit from them. I was called to him, and found him labouring under a most dangerous form of fever, complicated with deep jaundice, and attended by a conviction of approaching dissolution. His pulse was upwards of 120, soft, small, and weak. His bowels were relaxed, the stomach irritable, and the evacuations white. He had been attacked only the day before, and was restless and desponding. Calomel with camphor; effervescing draughts with the carbonate of soda in excess; Seltzer water with old wine; laxative enemata, and various other means, both internal and external, were prescribed according to the rapid progress of the malady. On the third night, he became delirious; soon afterwards, comatose; and, although the hæmorrhoidal discharge returned, from the use of the calomel, he died on the eighth day of the disease. Inspection of the body was not permitted.

crum. Derivatives, especially sinapisms, the terebinthinate epithem, or blisters, may be placed on these or other parts of the surface; and astringent or cold lotions, or injections, may be employed. — β. In the *passive form*, the acetate of lead with opium; the preparations of cinchona with the mineral acids, or the sulphate of quinine in the compound infusion of roses; the tincture of the muriate of iron, and other chalybeates; the balsams of Peru or of Copaiba, in large or repeated doses, or the terebinthinates, and the oil of turpentine, administered either by the mouth or in enemata, are the most efficacious means of arresting the discharge. (See art. Hæmorrhage, § 45. *et seq.*) — γ. *Plugging the rectum*, and the *actual cautery*, have been recommended in extreme circumstances. If the source of hæmorrhage is above the sphincter, a fatal internal discharge may follow from having recourse to the former of these. It is not practicable to resort to the latter, unless the spot whence the blood issues can be brought into view.

36. *b. The colourless mucous discharge* (§ 19.) from the anus, although a frequent attendant upon piles, is not necessarily so, as it may be occasioned by ascarides, &c. If it accompany internal or external tumours, and be independent of inflammation, slightly astringent and detergent injections; the internal use of the balsams, or of the spirits of turpentine, or of the balsams or terebinthinates combined with magnesia; and an occasional recourse to the stomachic aperient mentioned above (§ 33.), will generally remove it. When it is connected with inflammatory irritation, the means about to be stated (§ 42.) is most appropriate.

37. *D. Treatment of the Hæmorrhoidal Tumours.* — In all cases, the parts should be carefully examined by the practitioner, since the accounts given by patients themselves are very fallacious. Besides, the particular kind of tumour must be ascertained before the means of cure can be appropriately directed. Whether the piles be internal or external, or both, the anus should be washed with cold water after each evacuation; or with yellow soap and water, as suggested, in the course of some excellent remarks on the treatment of the disease, by Mr. Mayo. If the piles be internal, this should be done before they are returned. If they cannot be returned, or are permanently protruded, or altogether external, whatever may be their form, *pressure* is one of the best remedies that can be applied to them. After each evacuation, and having thoroughly cleansed the parts, a conical pad, or piece of ivory, made to slide along a bandage or handkerchief, should be passed between the nates, and fastened above to a cincture or belt worn around the loins, in the form of the T bandage. The pad may be provided with a concentric wire spring, the more internal coils of which rise in a conical form. This is the best external mode of employing pressure. — When the tumours are internal, and protrude at stool, dragging the mucous coat with them, or when they consist chiefly of varicose veins, a short metallic bougie, of an oval form, with a short slender neck, and a conical base to press upon the anus externally, may be attached to the bandage, carefully introduced into the rectum, and worn occasionally. Pressure will thus be made both above and within the sphincter, as well as without it. When introduced, the part of the *bougie* which rises above the sphincter being oval, varying in diameter with the peculiarities of the case, and being many times as thick as its slender neck grasped by this muscle, necessarily, from its shape, retains itself within the rectum, draws up with it the external tumours and prolapsed portion of the bowel, and presses its conical base externally against the anus, and upon the tumours or enlarged veins external to the sphincter. This combination of the *internal* with the *external method* of making pressure on the anus was introduced by Mr. Mackenzie into practice, and is often extremely efficacious in the treatment of hæmorrhoids, and of the prolapsus attending them.

38. Before having recourse to either of these, it will often be of service to wash out the rectum immediately after each evacuation, by injecting some cold or tepid water, with or without a few grains of sulphate of zinc dissolved in it; and, if the parts be painful or irritable, a little cold cream, or of a slightly anodyne or astringent ointment, or of any other most appropriate to the circumstances of the case, should be applied to the surface of the bougie, when about to introduce it. At the same time, the bowels ought to be kept gently open by any mild or cooling purgative that will not irritate the rectum. I have found equal parts of the compound infusions of gentian and of senna, with the soluble tartar, &c. taken at bed-time, the most beneficial, when the digestive organs were weak; and one or two teaspoonfuls of either of the following electuaries, or of one of those in the *Appendix* (F. 82. 98.), the most serviceable when plethora or hepatic disorder was present, or even when there was a manifest tendency to them.

No. 242. ℞ Potassæ Supertart. in Pulv. ℥j.; Sulphuris præcipitat. ʒij. — iv.; Confect. Sennæ ℥ij.; Syrup. Aurantii vel Zingib. q. s. ut fiat Electuarium molle.

No. 243. ℞ Potassæ Nitratis ʒij.; Confect. Sennæ, et Syrup. Zingiberis, āā ℥jss.; Succi Spiss. Sambuci ℥j. M. Fiat Electuarium.

39. These electuaries may be variously modified, according to circumstances; and the confectio piperis nigri may be substituted for the syrup, or the inspissated juice of the sambucus, or a small quantity of it may be taken twice or thrice daily, when there is much relaxation of parts, or in cold, languid, or leucophlegmatic habits. Aperient medicines, in hæmorrhoidal cases, should always be taken at bed-time, in such doses as to operate only once, or at most twice, in the morning. Subsequent irritation of the bowels during the day will thus be prevented, especially if the rectum be washed out by a lavement after passing a motion. When it is necessary to have recourse to the short bougie described above (§ 37.), it should then be introduced; its passage being facilitated by an anodyne or slightly astringent ointment or pomade.

40. When the tumours are internal and protrude only at stool, and when they continue, notwithstanding the use of the constitutional treatment advised above, aided by the modes of employing pressure, just described, the removal of them by an operation may be entertained; but it certainly ought not to be practised, unless it be clearly ascertained that they belong to the *first variety* (§ 9.), and never, if they present the

varicose character (§ 12.). Most surgical writers make no distinction between these tumours, and resort either to the *ligature*, or to *excision*, to remove them. Mr. COPELAND refers to several instances of dangerous and even fatal results from having recourse to the ligature; and yet Dr. J. JOHNSON, in an able review of the subject, states that he knows "that Mr. COPELAND's practice is, and long has been, almost invariably to employ the ligature;" his success by means of it entirely depending upon his drawing the thread as tight as possible, so as completely to destroy the vitality of the tumour. This is certainly the only mode in which the ligature ought to be employed, and the one in which it has been generally recommended and practised since the days of GALEN: but Mr. COPELAND only states the danger of this method, in his work; and neither advises it, nor points out the mode of performing it! LE DRAN considers that, in addition to the pain, the ligature may cause inflammation extending along the rectum to the intestines; and M. MONTEGRE objects to it for the following reasons — 1st, The operation is often difficult, and always very painful; — 2d, The tumours sometimes resist the ligature and, instead of falling off, ulcerate; — 3d, As they can only be tied in succession, the irritation produced by the first operation increases the swelling and inflammation of those remaining; — 4th, The ligature may produce all the effects of strangulation of the gut. Dr. J. JOHNSON thinks that these objections are founded on the inefficient mode of applying the ligature, and that few or none of them are valid, provided the thread is drawn to a proper degree of tightness at the beginning. I believe that even this more efficient mode is not secure from danger; that, in addition to the evils enumerated by MONTÈGRE, (*a*) inflammation of the hæmorrhoidal veins, extending even to the liver, (*b*) locked jaw, (*c*) retention of urine; and (*d*) contraction of the rectum, have in some instances resulted. It were to be wished that those who have been most in the habit of resorting to it, would state more fully than they have done, the results and the circumstances in which they confide chiefly in it. In the varicose form of the complaint, it is a most dangerous mode of treatment.

41. *c. Excision* of the tumours is preferred by LE DRAN, ABERNETHY, MONTÈGRE, COLLES, and CALVERT; whilst Sir ASTLEY COOPER and Mr. HOWSHIP are favourable to the *ligature*. Mr. MAYO advises this latter method for all internal piles; his mode of operating being the most judicious that can be followed. Sir E. HOME and Sir C. BELL recommend a combination of both methods — the excision of the tumour immediately after the application of the ligature. There can be no doubt of the danger of excision, and that it is very liable to be followed by great hæmorrhage, and by peritoneal inflammation, particularly when the tumours are formed by varicose veins. Numerous cases illustrative of the fatal or dangerous results of this practice are adduced by several of the authors referred to. When the piles are external, are covered by skin, and are formed as described, when considering the first form of tumour (§ 9.), excision is preferable. But I believe, from considerable experience, that either operation will be very seldom required, if the medical treatment be judiciously conducted. Neither the one nor the other should be resorted to without a careful examination of the pathological relations of the case, and of the form, state, and complications, of the local affections; nor without a preliminary treatment, consisting of one or two small cuppings over the sacrum, of a regulated state of the bowels, moderate diet, and of abstinence from fermented or spirituous liquors. In nervous and irritable persons, either operation is hazardous, and should not be performed unless in urgent circumstances. Dr. BURNE states that he has seen "a person die of sympathetic adynamic fever in four days after the removal of piles by a most accomplished surgeon. The nervous system of this patient was disturbed, prior to the operation, the shock of which excited high febrile movement and delirium, soon terminating in dissolution."

42. *E. Treatment of Inflamed Piles.* — The application of leeches to inflamed hæmorrhoids is very often advised. MONTÈGRE disapproves of the practice, as it frequently draws the blood to the parts. I believe that cupping on the loins or on the perineum is more beneficial. As more or less strangulation produces or accompanies the inflammation, the tumours should be pushed within the sphincter, if this can be done without aggravating the affection; and poultices or fomentations applied. When the inflammation is abated, MONTÈGRE advises injections of cold water; but care should be taken not to lacerate the tumours by the pipe of the syringe, as serious consequences may accrue, as in the cases recorded by ZACUTUS LUSITANUS, GASSENDI, and others. The external application of lint, moistened with a cooling and anodyne lotion, or frequently sponging the parts with it, will often afford relief. Equal parts of the solution of the acetate of lead, and of laudanum, diluted with rosewater will generally answer the purpose. If this lotion is not of service, it may be relinquished for poultices or poppy fomentations. *Incisions* or punctures of the inflamed and protruded piles are advised by some surgeons. MONTÈGRE condemns the practice; and Mr. CALVERT states that he saw an instance of fatal hæmorrhage from having had recourse to it. Much more dependence should be therefore placed upon local bloodlettings in the situations just mentioned, on low diet or abstinence, and on the refrigerants and cooling diaphoretics already recommended. If the inflammation terminate in suppuration or abscess, poultices or fomentations, and as early an external outlet to the matter as can be given it, are requisite. When tenesmus is present, cupping over the sacrum, ipecacuanha with nitrate of potash and opium, in frequent doses, anodyne fomentations, and the treatment about to be prescribed for this symptom (§ 46.) are most serviceable. The bowels should be kept gently open by means of castor oil, the aperient electuaries, and other laxatives mentioned hereafter (§ 46. *c.*).

43. *F. Treatment of Ulcerations, Fissures or Cracks.* — *a.* When *ulcerations* form between the tumours, or on their surfaces, the parts should be carefully cleansed after each evacuation, and an ointment, with a small proportion of Peruvian balsam may be applied to it, by a pledget of lint; or any other ointment of an astringent and anodyne kind may be tried. The balsams or terebinthi-

nates should be given internally, in the form of pill, with magnesia, in quantity sufficient to keep the bowels gently open.

44. *b. Fissures* or *cracks* between the tumours are attended either by exquisite pain, or by spasmodic constriction of the sphincter. More frequently both these latter morbid states are present; and occasionally the patient is tolerably free from both. When the lesion is thus simple, the treatment recommended for ulceration will often be sufficient; the local application of borax dissolved in honey will also be of service, as a substitute for an ointment; but when either pain or spasm of the sphincter is complained of, other means are required. In these cases I have found the addition of the extract of *belladonna* to any of the ointments usually prescribed give almost immediate relief. If a large proportion of the extract be employed, the effects ought to be carefully watched. Due attention to the functions of digestion and of excretion, and to existing constitutional symptoms, is always necessary. In less severe cases of this description, the extract of hyocyamus may be tried, before having recourse to the belladonna. M. BOYER and most surgeons in this country have advised a complete division of the sphincter ani muscle for the removal of this complaint. I have treated five cases of fissured anus since 1822, when the first came under my care. In all these the operation had been recommended; and yet they perfectly recovered in a short time, and without a single exception, by means of a purely medical treatment. Strict injunctions as to diet and regimen; the daily evacuation of the bowels, and afterwards washing out the rectum by emollient injections; careful ablution of the external parts, and the application of an appropriate ointment or cerate with belladonna; attention to the functions of the digestive and assimilating organs, and to constitutional symptoms, and the removal of general or local plethora, constituted the treatment. The belladonna was added to various kinds of ointment, according to the peculiarities of the case. In all it affected the pupils, and in two, it produced its characteristic eruption on the skin. Several years after I first employed this medicine for fissure with painful spasm of the sphincter, the account of M. DUPUYTREN's treatment of this affection by the same means appeared in the medical journals of Paris.

45. *G. Hæmorrhoidal pains and spasmodic stricture of the rectum*, generally connected with fissure or ulceration at the bases of the tumours, must be treated in the manner just stated (§ 44.). The pains are often intermittent, but very acute, during their continuance. Sometimes they extend down to the feet and ankles, and even occasionally assume a neuralgic character in these or other parts of the lower extremities, or give rise to spasm in various parts, especially in nervous or hysterical females. Some interesting instances of such affections have been recorded by Sir B. C. BRODIE, and have been observed by myself. In such cases, much benefit will generally accrue from taking the confectio piperis nigri, twice or thrice daily; and from adopting the constitutional and local treatment just recommended. This medicine may also be conjoined with an anodyne, and the bowels regulated by the medicines already suggested. M. MONTÈGRE strongly advises having recourse to the "*douche ascendante*;" or the forcible dashing of cold water against the anus, and to cold injections. In order to render the evacuation more easy, he directs the lavement to be thrown up when the inclination to stool takes place. Emollient injections may also be tried, either to facilitate the discharge, or to cleanse the rectum afterwards; and *suppositories* with the ceratum plumbi compositum, and opium, or stramonium, or belladonna, or any other narcotic may be occasionally introduced into the rectum, and they will seldom fail of giving relief. Great care ought to be taken in the administration of narcotics in lavements in the treatment of this or any other state of the complaint as they are often rapidly absorbed into the circulation, from the rectum and colon, and without having undergone any change. I have known half a grain of the belladonna, in one case, and thirty drops of laudanum in another, produce the most serious effects. When, however, either of these, or any other narcotic is prescribed in an ointment, pomade, or suppository, no unpleasant results will follow.

46. *H. Tenesmus, strangury, and constipation* often depend upon the same pathological states. — *a. The tenesmus* is generally owing to inflammatory irritation and congestion of the inner coats of the rectum, conjoined with spasmodic action of the muscular tunic. It will, with few exceptions, be removed by the means just directed (§ 42. 45.). In less acute, or more obstinate cases, the belladonna plaster may be applied to the perineum or sacrum. Five or six grains of the extract of poppies, or one or two drachms of the syrup, may also be occasionally thrown into the rectum, with any tepid emollient enema; or a suppository of the kind just stated may sometimes be introduced. — *b.* If *strangury* or *dysuria* supervene, it is to be imputed to the extension of the affection of the rectum to the neck of the bladder, or to the prostrate and urethra; and it will generally be found that it will be removed or relieved by the treatment recommended for tenesmus. — *c. Constipation* also frequently proceeds from the same local changes as occasion tenesmus and strangury, and from tumours or enlarged and congested vessels obstructing the canal of the intestine. In either case, there is more or less obstacle to the passage of a consistent motion, and much pain attending it. If these symptoms be allowed to continue, the complaint will be aggravated; or they will give rise to still more serious changes. In removing them, the milder laxatives will be found more serviceable than active purgatives; but those which act also upon the liver should be selected. Mercurials aggravate and even bring on tenesmus, and therefore cannot be employed, with the exception of hydrargyrum cum creta. This may be taken in small doses at bed-time, with ipecacuanha and hyoscyamus, or with extract of taraxacum. Some one of the electuaries already prescribed (§ 38.), or the decoction of taraxacum with the subcarbonate of soda, or the tartrate of potash with tincture of senna and syrup of roses, or of senna may be given, and continued for some time. A Seidlitz powder taken about an hour before breakfast is also one of the best aperients in hæmorrhoidal cases. A frequent recourse to warm lavements is injurious in this complaint, as they relax the parts, and solicit the circulation to them.

M. MONTÈGRE, whose authority in this matter is very high, advises the injection of cold water in preference, as it strengthens the bowel; but he directs no more than will fill the rectum (about half a pint) to be thrown up. In the more severe states of the disease, especially in cases of fissure, of spasm of the sphincter, and of painful evacuation, he considers the cold injection, every time that a motion is about to be passed, most beneficial.

47. *I. Re-establishment of Suppressed Hæmorrhoids.*—When the suppression or interruption of piles is followed by aggravation of some related complaint; or injures the general health; or threatens some important organ, as the lungs, brain, liver, &c., there ought to be no hesitation as to having recourse to means calculated to reproduce them. A gentleman of about fifty, residing near Russel Square, subject to returns of humoral asthma often passing into bronchitis, as well as to frequent attacks of hæmorrhoids, experienced great aggravation of the former, in 1835, after the latter had disappeared for some time. I directed him to be cupped, but he neglected to adopt my advice: I therefore prescribed a full dose of calomel and aloes, and repeated it in a few hours, with the view of restoring the suppressed piles. This had the desired effect; but severe inflammation of the tumours and strangury supervened, followed by an abscess between the prostrate and anus. This broke externally, and soon healed; and the patient has not been confined a day since. Another gentleman, between fifty and sixty, had experienced severe headachs from the non-appearance of the hæmorrhoidal discharge. He was advised, in 1629, when I saw him, to lose blood; to live abstemiously, and to relinquish malt liquors. The first only of these injunctions was complied with, and his complaints returned. The same advice was again given, and the purgatives formerly prescribed were changed to those which act more energetically on the rectum. The hæmorrhoids were reproduced, and the headachs disappeared. Such instances are, however, not at all uncommon. Unless in urgent cases, it will be preferable to attempt the restoration of piles by the more gentle means at first, as the exhibition of those which are most irritating, before the action of milder remedies is ascertained, may excite inflammatory action, of a very severe kind, and great distress, as in the case first adduced. A reference to the causes which commonly occasion the complaint will show the means most likely to reproduce it. The most appropriate, however, are pediluvia or semicupia; the hip-bath; the application of leeches to the anus; the use of purgatives which act especially on the rectum, as calomel and other mercurials in full doses; aloes, colocynth, rhubarb, sulphate of soda, &c.; warm injections; aloetic enemata, &c.

48. *K. Of Regimen and Prophylaxis.*—An abstemious regimen is required during the attack, and is even more necessary in the intervals; for it is chiefly by diet, and prudent conduct, at these times, that this complaint, and its contingent ills, are to be warded off. A temperate climate is best suited to persons liable to hæmorrhoids; but sudden vicissitudes of weather are unfavourable, and should be guarded against, by wearing flannel next the skin, and by warm clothing. Malt and spirituous liquors ought to be avoided; and temperance in food and drink should be observed. Too warm and soft beds are improper; and sitting on soft warm cushions is still more so. Regularity in the hours of eating, sleeping, waking, and taking exercise, is generally of service, and when medicine is requisite, it should be such as will correct morbid action, increase scanty secretion and excretion, particularly of the biliary and mucous surfaces, and preserve the bowels regularly and gently open. Cold ablution of the anus, after each motion, and, if hæmorrhoidal tumours protrude, the careful sponging of them before they are returned, will not only remove disorder, but prevent its return, if continued without interruption in winter as well as in summer. Venereal excesses, the more violent mental emotions, and all the depressing passions, are injurious. Exercise in the open air, especially on horseback, is always of service if taken regularly, although rough-riding, especially by those who are not accustomed to it, is often a cause of the complaint. — (See also RECTUM — *Diseases of*.)

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HAIR — ALTERATIONS OF.

Classif. — General Pathology — *Symptomatology* ; *Ætiology* : — Special Pathology, and Therapeutics.

1. The hair being an appendage of the skin, and the natural covering of one of the most important parts of the body, material changes in its state or appearance are interesting to the medical practitioner, as furnishing indications of several pathological conditions. Nor is the growth or removal of the hair devoid of importance, especially in certain diseases, and in convalescence from dangerous maladies. The various alterations presented by the hair are rarely primary or idiopathic, and seldom even depend upon local changes merely; but are usually the more remote consequences of debility and chronic disorder of the digestive organs, frequently associated with superinduced affections of the skin and of the pilous follicles, and occasionally also with general cachexia. In many instances where the hair undergoes a marked change, the nails likewise present more or less alteration.

2. I. Effects of Removing the Hair.— The consequences of removing the hair depends, 1st, upon the quantity of hair removed from, and left upon, the scalp; 2dly, upon the states of the system and of the circulation in the head at the time of removal. When a person is in good health at the time, little further results from cutting off the hair than headach, cold in the head, or earach, or sore throat. M. Jourdan states, that when the long hair worn by the soldiers in the revolutionary war was cut off in all the regiments, many complained of headachs of several weeks' continuance; but he was not aware of any fatal effect being produced. The removal of the hair in cases of inflammatory excitement of the brain, or in that sthenic state of vascular action which requires having recourse to cold applications or the cold affusion, can seldom be productive of injury, although it seems very doubtful if it be so beneficial as is very commonly supposed; but it is very different in other circumstances. In adynamic, nervous, low, or typhoid fevers, or in exanthematous fevers presenting these characters — and still more especially during early convalescence from these, the removal of a large quantity of the hair very close to the scalp sometimes aggravates the symptoms. During the advanced stages of these diseases, the circulation in the scalp, and the perspiration from it, are checked, and congestion, or even serous effusion, is either thereby favoured, or induced, or increased. Therefore, in these low states of action and of vital power, the hair should not be shaved or closely cut from the scalp, unless when a blister is about to be applied in this situation. During convalescence from these or other dangerous maladies, the early removal of the hair, particularly when long or thick, is not without risk. Seger, Vassal, Lanoix, Alibert, Jourdan, and others, have met with dangerous and even with rapidly fatal effects from this measure. The risk from it is great in proportion to the quantity of hair removed, and of the perspiration proceeding from the scalp. I have seen, in several instances, ill effects follow the removal of long thick hair from the heads of delicate children and females. In children thus constituted, the hair should always be kept short; and, if it be allowed to become abundant, it ought not to be closely cut at once. Whenever much hair is removed, a warm covering to the scalp should be immediately substituted, and worn for some time afterwards. Persons strongly constituted, and taking regular exercise in the open air, may not experience any disorder from the neglect of this precaution; but the weak, or the exhausted, or convalescents, will generally suffer if they act contrary to this advice.

3. Persons in the habit of wearing long *beards*, have often been affected with rheumatic pains in the face, or with sore throat, upon shaving them off. In several cases of frequently recurring, or of chronic sore-throat, wearing the beard under the chin and upon the throat has prevented a return of this complaint.

4. On the other hand, the *removal of the hair*, or keeping it closely cut, is often productive of

good effects: I have seen it of service in headachs. Frequent cutting promotes the growth of the hair, and admits of the usual operations of brushing and combing acting more efficiently on the scalp. In cases requiring cold sponging, the shower-bath, &c., shortness of the hair is an advantage. Morgagni (*Epist.* viii. *Art.* 7.), Grimaud, Richerand, and others, have adduced instances of recovery from mania, headachs, and various nervous affections, by keeping the head closely shaved. Whether the hair has any influence or not in retarding the passage of positive electricity from the body, or in otherwise affecting the electro-motive or galvanic actions taking place in the system, it is difficult to determine; but it seems very probable that it has.

5. II. Of Excess of Hair.—*A. General excess of hair* is not often seen. I knew two persons whose bodies were so thickly covered with hair, excepting the parts of the face, hands, and feet, that are usually devoid of it, as nearly to prevent the skin from appearing through it. Both were remarkable for strength and endurance; and in both the hair was dark brown. Their joints were small, the muscles uncommonly developed, and the adipose and cellular tissues scanty.—*B. Partial excess of hair, or the growth of hair in unusual parts — Extraneous hair — the Trichosis hirsuties of* Good — is very common. The most frequent examples of it are in sterile women, who often have more or less of a beard after they pass the age of thirty. Since Hippocrates, growth of the beard in females has been imputed to deficient menstruation; but there are very numerous exceptions to this. Dr. Good states that one of the most striking cases he ever observed was in a woman who was subject to excessive menstruation, and who died at forty. The growth of hair on the upper lip is sometimes seen in young, as well as in aged women; and, either on the chin chiefly, or on both the chin and upper lip, is often met with in females about or after the change of life, and occasionally even in those who have had several children. — *a.* Tufts, or *patches* of hair, in situations where none is generally seen, have been frequently met with. When the patches are small, they have been usually denominated *nævi pilares*, or hairy nævi. In rare instances, however, they have been remarkably large. Cases are adduced by Rayer, Grivet, Bichat, Dufour, and others, in which these patches covered a large portion of the surface of the body, were of a brownish hue, somewhat elevated above, and quite different from the colour of, the surrounding skin.

6. *b.* The hair also, in its natural situations, may acquire a remarkable length. This is not a rare occurrence as respects the hair of the head; but it is very seldom met with in other places. Brückmann saw the hair of the head reach the ground; and Otto refers to an instance of the pubic hair of a female being an ell and a half long. The premature growth of hair in natural situations, as on the pubis, chest, &c., has been sometimes seen, especially in connection with the too early developement of the genital organs. Several instances of this kind are on record.

7. *c.* The growth of hair *on mucous membranes* has been met with in rare instances; in different parts of the digestive mucous surface (Walther, Otto, Villerme, &c.), of which various cases are referred to in the *Dictionary of Medical Sciences* (vol. vii. p. 37. *et seq.*), in the gall-bladder (Bichat), in the uterus and vagina, (Meckel, &c.) and in the urinary bladder (Cruveilhier, &c.). But it is extremely doubtful that the hair was developed in some of the situations where it has been found, as no information, in most of the cases, is given as to its roots. It is more probable, therefore, that it was introduced from without, or had accidentally passed into these situations.

8. *d.* The development of hair in the *interior of cysts* is more common, and has been more accurately observed. These cysts have been most frequently found in the ovarium, in the substance of the uterus, below the skin, and in various other parts. They seldom contain hair only, but more frequently also fatty matter, bones, teeth, &c. The hair is sometimes attached to the interior of the cysts, but it is more frequently entirely detached. It would appear, from the observations of Warren, Tumiati, Bosc, Schacher, Meckel, and others, that it is formed from roots or bulbs, as in the skin; and that in consequence of an alteration in these, it often becomes entirely unconnected with the surface from which it was formed. The researches, however, of Tyson, Morand, Bichat, and Cruveilhier, do not confirm this view, as, in the cases they met with, the hair was not attached at one of its extremities, either to the cyst, or to the other matters which the cyst contained. From the circumstances of these cysts being found most commonly in the ovaries, their formation has been imputed to an imperfect or unaccomplished coition. The fact that they have been sometimes met with in the ovaria of females, who had not reached puberty, or in whom the hymen was unruptured, has been considered to militate against this mode of accounting for their formation. But this objection to the doctrine is not valid; as it merely shews the impossibility of complete coition having taken place, and is no proof that the act has not been attempted.

III. Morbid States of the Hair.—Classif. —6. *Class*, 3. *Order* (*Good*). IV. Class, IV. Order (*Author*).

9. i. The hair of the head may become weak and slender, and may split at the extremities—the *Trichosis distrix* of Good, or *forked Hair*. This is a very common affection, and depends upon a deficient action of the bulb of the hair, in consequence of debility, or impaired vital power, frequently connected with weakened digestion and assimilating function.

10. ii. The hair is sometimes *rigid*, *crisped*, and *hard*. It is then usually very short and rough, and harsh to the touch. This state seems to depend upon a deficient secretion of oily matter, by which the hair is covered and protected. It is more rarely *bristled* — *Trichosis setosa of* Good. This alteration is noticed also by Plenck, but in a loose and unsatisfactory manner. Of the *crisped* and dry state of the hair, I have seen some instances; of the bristled, I have not known even of a single case.

11. iii. The *Treatment* of these states of the hair consists in frequent cutting, and in the use of the local applications advised for loss of hair (§ 32.), more particularly the ointment prescribed at that place. Attention should also be paid to the digestive, assimilating, and excreting functions; as

I have never seen either of those affections of the hair unconnected with disorder of these functions.

12. III. Felting or Matting of the Hair — *False Plica.* — The long hair of persons, who have neglected it, frequently becomes felted, or inextricably interlaced. Females after long illnesses are subject to it, particularly in Poland, and other countries where cleanliness in respect to the head is so much neglected. It is somewhat favoured by a morbid secretion from the scalp, and is occasionally met with in connection with *porrigo favosa* and other chronic affections of this part. It has been particularly noticed by Davidson, Kreuzer, Boyer, Gasc, and other writers on *Plica*, and been confounded by many authors with that disease. Jourdan and Rayer have, however, pointed out the great differences between them. Felting of the hair occurs independently of any alteration of the hair itself or of its bulbs, and without the constitutional and local disorder ushering in or attending *plica*. (See § 34.) — The remedy for it is obvious.

IV. Loss of Colour of the Hair. — Syn. *Canities;* Πολιότης, πολίωσις, (from Πολος, white, hoary); *Trichosis poliosis,* Good; *Canitia,* Auct.

13. Defin. *Hairs prematurely grey, hoary, or white.*

14. i. History.—Loss of colour of the hair may be accidental, premature, or senile; and it may be partial or general. The hair begins to be grey first at its free extremities; but it often changes in that portion which is nearest the skin. This latter circumstance shows that the hair has been first secreted of its natural colour, and afterwards secreted grey or white, in consequence of an affection of its bulbs, and is frequently observed when the loss of colour has been preceded by *eczema*, or any other chronic affection of the scalp. Men usually begin to get grey about forty, many between thirty and forty, and some not until a more advanced age. The occurrence of gray hairs in persons under thirty is not rare; and I know two individuals, one a male, the other a female, considerably upwards of seventy, who have thick dark hair, without any being grey. The hair of the head is that which first loses its colour from age, the change usually commencing on the temples. The white hairs are at first few, but they soon multiply. When they fall out, they are seldom reproduced, so that baldness often follows canities. Females generally retain the colour of their hair longer than males, and the fair longer than the dark; but fair hair often falls out at an early age.

15. Canities, either partial or general, is very rarely congenital, or observed in childhood. The very fair, or almost white hair, with which fair children are sometimes born, is not the change under consideration. Greyness of parts only — in tufts — has been often noticed, and is owing to some affection of the scalp in those parts. This partial loss of colour may occur on the head, in the beard, or in other situations. Instances of this kind, and of the change taking place on one side only, have been recorded by Lorry, Ludwig, Hagedorn, Rayer, and others, and are by no means rare. Loss of colour of the hair commonly is gradual and slow; but in some cases the change has taken place in a few hours, or in the course of a single night. The case of Mary Queen of Scotland has been often adduced, and others are mentioned by Voightel, Bichat, Cassan, and Rayer. When hair grows from cicatrices without pigment, it is colourless; and in general or partial leucopathia, the hair is white or grey in most instances. In senile canities, however, the scalp seldom participates in the loss of colour.

16. ii. Causes. — *A.* The *remote causes* of premature canities are — disappointments, anxiety of mind, extreme or protracted grief; unexpected and unpleasant intelligence; fear, fright, or terror; great mental exertion; paroxysms of rage or anger; severe, repeated, or continued headachs; rheumatism of the head and toothach; the salts from the evaporation of salt-water from the hair; eczema and other chronic eruptions of the scalp; over indulgence of the sexual appetite; excessive hæmorrhage or other discharges, mercurial courses, and an hereditary predisposition.

17. *B.* Blanching of the hair appears to *arise from* a diminished secretion of the colouring matter by the bulbs or follicles. Dr. Macartney thinks very justly that an organic action must be admitted to exist in the substance of the hair, in order to account for the changes to which it is subject, and which sometimes takes place so rapidly as otherwise not to admit of explanation. M. Rayer states, "that grey hairs have been said to be without *marrow* or matter in their interiors, in place of which there is an empty canal." Vithof says that the bulbs of those hairs which have become white are somewhat atrophied, and Dr. Macartney thinks that the change is owing to the absorption of the colouring matter when it takes place rapidly.

18. iii. Treatment.—When canities is the result of age and of partial or general leucopathia, it cannot be made the subject of medical treatment. But when it is partial or depends upon chronic inflammation of the scalp having extended to the bulbs of the hair, the removal of this state, and of the white hairs, is sometimes followed by the production of hairs of the natural colour. Various means of dyeing the hair have been resorted to; but these are unworthy of notice. Applications to the hair, with the view of preventing it from becoming grey or falling off, have been frequently employed. Amongst these, the prepared marrow of the ox or deer, bears' grease, honey-water, and substances mentioned hereafter (§ 32.), are most deserving notice.

V. Preternatural Colour of the Hair.— Syn. *Miscoloured Hair; Trichosis Decolor,* Good.

19. The hair may be changed from a very light to a very dark colour. Instances of this have been adduced by Alibert and others, and are not infrequent. It may be also changed to a reddish yellow, and even to green or blue. It has likewise been observed of a spotted or variegated hue; this, however, is not uncommon. Hair that has become grey has, in very rare cases, been changed to black. The instances in which the hair has been said to have been green or blue have most probably arisen from the action of metallic fumes on hair of a light colour. The subject is more fully discussed by M. Rayer, but it is not deserving of further notice.

VI. The Want or Loss of Hair.—Syn. *Alopecia;* ʽΑλώπεκια (from ἀλωπηξ, a fox), Galen; *Area,* Celsus; *Gangrena Alopecia,* Young;

Alopekia, Swediaur; *Defluvium Capillorum*, Sennert; *Fluxus Capillorum*, Auct. var.; *Der Kahlkopf*, *Kahlheit*, Germ.; *Chauveté*, *Calvitie*, *Alopécié*, Fr.; *Calvezza*, Ital.; *Baldness.*

20. Defin. — *The defect or loss of hair, either limited to one or more parts only, or diffused and more or less general.*

21. Alopecia may be *congenital*, and is then owing to the tardy development of the hair; which often does not appear until the end of the first or second year. This form of baldness is, however, very rarely permanent. If it is, the circumstance is to be imputed to the absence of the follicles.

22. *Decay* of the hair may take place in various states of the scalp and of the constitution. It may occur either prematurely, or as a consequence of age. In the former case it is the result of disease, and is either *limited* — partial, but complete, as far as it extends — or *diffused*, and more or less general: in the latter it is always *diffused*, and depends upon the change which the integuments of the body undergo at that period of life. I shall consider, *first*, limited or partial alopecia; and, *secondly*, diffused alopecia; this latter comprising, (*a*) Premature loss of hair, and (*b*) Decay of the hair from age.

i. Limited or partial Baldness. — Syn. Ὄφιασις; (from ὄφις, a serpent); *Ophiasis*, Celsus; *Area*, Auct. var.; *Alopecia Areata*, Sauvages; *Porrigo Decalvans*, Willan, Bateman; *Trichosis Area*, Good; *Alopecia partialis*, *Alopecia circumscripta.*

23. Charact. — *Bald patches often without decay or change of colour of the surrounding hair, the bared spots being shining and white, frequently spreading or coalescing.*

24. Partial alopecia is the consequence of various alterations of the secreting follicles of the hair induced by impetigo, fevers, chronic eczema, sycosis, &c. The variety described by Willan, under the name of *Porrigo decalvans*, is the most remarkable which comes under the present head. The scalp, or skin of the chin or cheeks of persons affected with it, presents one or more patches, frequently of a circular form, entirely devoid of hair, although surrounded by that of the natural growth. The skin of these patches is smooth, without redness, and unusually white; and their areas extend gradually. When several exist near each other, they ultimately unite. A large portion of the scalp may be thus denuded of hair. Neither vesicles nor pustules, nor any other kind of eruption can be detected in the surface of these patches. This affection occurs commonly in the hairy scalp, and in children; but it is not infrequent in adults, and in the beard. In *children* it often assumes an irregular serpentine or winding form. I have seen it in them associated with various disorders of the digestive organs, and occasionally with those of the brain; but it has also been apparently independent of any internal affection. Dr. Elliotson has seen it in a child with disease of the brain (*Lond. Med. Gaz.* vol. vii. p. 639. and v. viii. p. 30.) The cases which I have met with in adults were not connected with any other disorder. I agree with Good, Rayer, and Todd, in viewing it as a variety of alopecia, and entirely unconnected with porrigo.

25. A variety of partial alopecia has been noticed by MM. Mahon and Rayer, that differs from the preceding chiefly in the appearance of the affected surface, and in the presence of a few altered and brittle hairs. In this latter respect, it nearly approaches the morbid state of the hair already mentioned (§ 10.). On one or more circular patches, the hair seems broken off to within a line or two of the skin. The surface of the patches is dry, appears rough to the eye, and feels more so to the touch. It is slightly bluish, and a fine white powder can be detached from it. The affection begins at a point, and spreads; similar spots forming in the vicinity of the one which first appeared. These may extend until nearly all the scalp becomes affected.

ii. Diffused Alopecia. — Syn. *Calvities*, *Depilatio*, *Defluvium Pilorum*, Auct. var.; *Trichosis Atherix*, Good.

26. Charact. — *The decay or fall of the hair occurring in a diffused or general manner; the hair becoming gradually thinner, commonly at first on the crown, or on the forehead and temples.*

27. Decay of the hair in a gradual and diffused manner may take place prematurely, and as a consequence of disorder of the digestive organs, or of the constitution, or of a local affection of the scalp extending to the pilous follicles. It is often an indication of premature exhaustion of organic nervous energy. — *Congenital absence*, or defective development of the hair of a permanent kind (§ 21.) has been rarely observed. Instances of it have been recorded by Heister, Danz, Wells, and Rayer. Premature loss of hair is not confined to the scalp, but often extends to the eye-brows, beard, and other parts of the body. It may be even general. Mr. South (*Translation of* Otto's *Pathology*, p. 120.) mentions a case most probably of this kind. A total loss of hair, however, is more common than general defective development of a permanent kind; and is met with chiefly in mature or far advanced age. J. P. Frank saw it in a young man; and instances of its sudden occurrence are recorded by Paulini, and Heister, and in the *Journal de Physique* (t. xiv.), and in the *Berlin Medical Transactions* (t. iii. p. 372). Most commonly the hair of the head, of the axillæ, and pubes, gradually and successively fall off. In rare instances the hair has been renewed of a finer quality, as in the cases recorded by Lemery and Bonina (*Journ. des Progrès, &c.* t. xiv. p. 244.) A singular case of baldness confined to one side of the body is related by Ravaton.

28. Causes. — *A.* The *remote causes* of baldness are — 1st, Whatever debilitates and exhausts the system, as profuse or prolonged discharges; dangerous hæmorrhages; masturbation, or immoderate indulgence of the venereal appetite; low, typhoid or adynamic fevers; care and disappointments; the depressing passions and anxiety of mind; excessive application to study; the contact of rancid, septic, or putrid animal matters with the scalp; more rarely the syphilitic poison, and the frequent or prolonged use of mercury. It may also be caused by exposure to the sun's rays, by the fumes of quicksilver, by the friction of a military cap or helmet, by eczema or other chronic eruptions of the scalp, and by the use of tobacco. It has been said to be endemic in some places. Leo Africanus has stated, that baldness is com-

mon in Barbary; Tournefort, that it is almost universal in Mycone, one of the Cyclades; and Sir R. Sibbald that it was frequent in Shetland in his time, owing to the fish diet of the inhabitants. That living chiefly on fish, and on poor unwholesome food may aid in its production, is not improbable. The salts of sea-water left in the hair will sometimes cause it indirectly. Extreme distress of mind has produced a general loss of hair within twenty-four hours; but such instances are extremely rare. Since Hippocrates, it has been said that eunuchs do not become bald; and Schenck remarks, that baldness does not commence, until after the generative functions are exercised. It is certainly much less frequent in females than in males.

29. History and Pathology. — *A.* The fall of the hair may take place in a few days, or even in a shorter period; or so slowly as to escape observation. The skin of the denuded part usually presents the ordinary appearance, especially in senile alopecia. In some cases, it is pale, or of dead whitish colour, and furfuraceous; and occasionally it is covered by scurf, or scales, and is distinctly inflamed. In the former case, its sensibility is not materially altered; in the latter there are heat, itching, or pricking. The hair is often more or less altered before it falls out, being thin, harsh, dry, weak, and stunted, or deprived of colour. This is most frequently the case when it proceeds from causes acting directly on the scalp, and from chronic eruptions of this part.

30. *B.* Loss of the hair proceeds from changes in the bulbs: — 1st, From atrophy or wasting of the follicles, as in senile alopecia, and in that state of the affection which is produced by excessive venereal indulgences; — 2d, From an impaired or suspended vital action of the pilous follicles, as in the alopecia that takes place suddenly or rapidly from mental emotions, &c.; in that which follows malignant adynamic or putrid fevers; and in that variety which has generally been known by the name of porrigo decalvans,—and, 3d, From chronic inflammation, extending to the bulbs. Equally important with a knowledge of the particular condition of the follicles or bulbs to which the loss of hair is to be imputed, is the investigation of the affections with which it is related, or upon which it is dependent. Although alopecia is often a strictly *local* and *primary* affection, proceeding directly from local causes, yet it as frequently depends upon disorder of the digestive and assimilating organs, and upon the general state of the system. As Dr. T. J. Todd justly remarks, it may arise not only from a change primarily induced in the follicles, but also from the extension of disease to them from the tissues in which they are situate. In this latter case, the alopecia may be also *local*, but it is *consecutive*, the follicles being altered by becoming involved in the inflammation constituting an adjacent cutaneous disease. The baldness following eczema, porrigo, impetigo, &c. is an illustration of this.

31. *C.* Alopecia is most frequently *symptomatic* of debility or cachexia, produced by the exhausting causes enumerated above (§ 28.). After fevers, the hair is generally exfoliated with the cuticle, and sometimes even with the nails; but as the follicles have their vital actions restored, the hair is reproduced. When, however, the hair falls out in phthisis, diabetes, and other cachectic maladies, no attempt at restoration takes place. Alopecia may also be symptomatic of chronic inflammation of the digestive mucous surface. Indeed, this is a frequent cause of it. The connection of this state of the digestive organs with chronic cutaneous eruptions is fully established and well known; and the pilous follicles are sometimes the parts of the integuments affected thus sympathetically; the affection implicating them either principally or solely, or in conjunction with other parts of the skin. This dependence upon, or connection with, derangement of the digestive and even of the biliary functions should never be overlooked in practice; for, although I cannot agree with Broussais and his followers, that the external change is produced by the internal inflammatory irritation, or that the internal complaint is so generally inflammatory in its nature as they would make it appear, yet I am convinced that there is a very close connection often existing between the internal and external affection; both affections generally proceeding from, and being associated by, the same pre-existent disorder; which disorder may generally be referred to the state of organic nervous function or power.

32. Treatment. — *A.* In *limited* or partial alopecia, more particularly that variety usually called porrigo decalvans, and in all those cases that appear independently of inflammatory action — that depend upon the first and second pathological states enumerated above (§ 30.) — stimulation of the parts, by the decoction of walnut-tree leaves, or of the leaves of the solanum, — by the infusion of rosemary, or of the lesser centaury, or of mustard seed, — by various spirituous and aromatic washes, — by ointments containing the tincture of cantharides, or some essential oils, — or by embrocations of thyme, lavender, the juice of onions, of garlic, &c., has been very generally recommended. M. Rayer, however, does not consider this practice very successful. Dr. Willis has seen the common mercurial ointment prove of service. The balsam of sulphur, applied to the scalp, is praised by Ruland; a solution of the sulphate of copper in spirits, by some recent writers, and blisters by Arndt. I have seen a strong solution of the nitrate of silver, in some instances, and either an infusion of capsicum, or ointments with the tincture, in others, applied to the affected surface, and persisted in for some time, restore the hair. Dupuytren generally prescribed an ointment with a strong tincture of cantharides. I have, in several cases of baldness, of the kind under consideration, employed an ointment containing the balsam of Peru with complete success. It has the effect of rendering the hair thick and persistent, and in promoting the growth of it in parts from which it had fallen out from impaired action of the follicles. The following is the formula that I have usually employed.

No. 244. ℞ Adipis Præparatæ ℥ ij.; Ceræ Albæ ℥ ss.; lento igne simul liquefac, tum ab igne remove, et, ubi primum lentescant, Balsami Peruviani veri ʒ ij.; Olei Lavandulæ ♏ xij. adjice, et assiduè move donec refrixerint.

33. When alopecia proceeds from eczema, impetigo, fevers, &c., the treatment should be entirely directed to the removal of these eruptions. When this is accomplished, and the skin remains dry, tense, or furfuraceous, the part should

be shaved, and the surface anointed with the above ointment, or with some substance of a similar nature, as an ointment with the oil of mace, &c. The tincture or infusion of tobacco, as recommended by ZACUTUS LUSITANUS, and often empirically resorted to, will also be of service in this and in some other states of the disorder. In every form of the affection, the digestive, assimilating and excreting functions should be regulated or assisted; and associated internal congestions, or inflammatory irritations removed by appropriate means. Alopecia, as well as premature greyness of the hair, is often caused by disorder of these functions, and associated with these internal diseases; and neither the one nor the other can even be retarded in their progress, unless the treatment be directed with a strict reference to these pathological connections.

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VII. TRICHOMATOSE HAIR. — SYN. *Τρίχωμα*, *Plica Polonica*, *Plica Polonica Judaica*, Auct. var.; *Plica Saxonia*, Linneus, Vogel; *Plica Belgarum*, Schenck; *Trichoma*, Manget, Sauvages, Cullen; *Lues Sarmatica*, *L. Polonica*, *L. Trichomatica*, Auct.; *Tricæ*, *Tricæ incuborum*, *T. Scroforum*; *Cirragra*, *C. Pollonorum*; *Affectio Sarmatica*; *Helotis*, Agricola; *Ecphyma trichoma*, Young; *Trichosis Plica*, Good; *Plica*, Rayer; *Plica Cachectica*, Author; *Weichselzopf*, *Iudenzopf*, Germ.; *Gwozdziec*, Pol.; *Plique*, *P. Polonaise*, Fr.; *Plica Polonica*, Ital.; *Plicose Hair*, *Felted Hair*, *Cachectic Plica*.

CLASSIF. — 3. *Class*, 3. *Order* (*Cullen*). 6. *Class*, 3. *Order* (*Good*). IV. CLASS, IV. ORDER (*Author*).

34. DEFIN. — *The hair thickened, softened, felted, and agglutinated by a morbid secretion from their bulbs and from the scalp.*

35. The anomalous development and agglutination of the hair, occasionally observed in Poland, and more rarely in some adjoining countries, and peculiar to them, has attracted much attention during the two last centuries. It frequently appears in the course of some acute or febrile disease, or of some chronic internal complaint; but it also occurs, although more rarely, as the primary or principal malady. Hence it has been considered by some writers as an idiopathic disorder, but by others, and very recently by Dr. MARCINKOWSKI and BRIÈRE DE BOISMONT, who had frequently seen it in Poland, chiefly as a contingent critical affection.

36. i. DESCRIPTION. — After an attack of acute fever, characterised by languor, pains in the limbs and head, vertigo, an invincible disposition to sleep, rushing noises in the ears, pains in the orbits, injection of the conjunctiva, coryza, and sometimes clammy sweats, indications of plica are sometimes observed. Occasionally the febrile disorder is attended by redness of, or by an eruption on the skin, and an offensive perspiration. M. LEBRUN and the writers just named state, that it may occur in the course of any acute or chronic affection of the brain, or of the viscera of the chest or abdomen; and that, although it often is observed in the young and robust, it always is preceded and attended by more or less febrile or internal disease. Hence the remarkable differences in the descriptions of the constitutional symptoms attending it, as furnished by most authors; and hence the reason for viewing it as proceeding from a cachectic state of the constitution developed by these complaints, and by the peculiar habits and circumstances of those attacked by it. According to this, the opinion of Drs. MARCINKOWSKI and BRIÈRE DE BOISMONT, that it is generally *critical*, and should be treated by means directed to the primary disorder, will appear perfectly rational. M. JOURDAN and others contend that it is both primary or *idiopathic*, and *critical*; and that in the first form it appears suddenly or in a short time, attended by severe pains, resembling those of rheumatism or gout; in the second, it supervenes slowly, in the advanced course of various affections different in nature and character, but generally accompanied with viscous perspirations of the head. The scalp is most commonly or chiefly affected; but the hair in other situations and the nails are frequently also implicated.

37. The scalp is sore to the touch, excessively sensible and itchy; a clammy offensive sweat exudes from it, and agglutinates the hair, which loses its lustre and appears thickened, softened or distended by a glutinous fluid of a reddish or brownish colour. This fluid is produced at the extremities of the bulbs, and is transmitted to the ends of the hair. A peculiar offensive smell attends this exudation from the hair and scalp. The hair is matted or agglutinated in different ways — sometimes in single locks, of various thickness and length, resembling ropes — *male plica — plica multiformis*. Occasionally the hair is stuck together in one mass or cue. *Plica caudiformis;* and in other instances it is felted into a mass or cake, of various sizes — *Female plica.* The hair of the beard, pubis, and axillæ, may also present similar appearances. When thus diseased, the hair often acquires a great length. Instances of its reaching the length of some yards are adduced by the writers referred to at the end of this article. Professor Kaltschmidt possesses the pubes of a female, the hair of which may have readily reached round the body. The surface of the scalp is often covered with superficial ulcerations, or with incrustations formed by the morbid exudation; and numbers of *pediculi* are frequently seen in this and in other parts of the body. The nails of the hands and feet commonly become long, hooked, yellowish, livid or black.

38. Meckel injected the scalps of two persons who died with plica, but none of the injection reached the bulbs of the hair. J. Frank and La Fontaine found the hair-bulbs much enlarged, and full of a yellowish glutinous fluid; Gilibert also observed them distended by a dark fetid matter. Schlegel states that the hairs are enlarged, and filled with a yellowish brown fluid; and Rolfinch and Vicat say that they are so frequently distended with this fluid as to burst, and to discharge it externally. Similar changes have been observed by Gasc and others. M. Blandin remarked the bulbs to rise above the level of the skin, within the infundibuliform cavity of the root of the hair, as the papilla or bulb of the feather elongates and produces the quill in the young bird (Rayer). M. Sedillot found, on examining trichomatous hair with a microscope, the internal canals much larger than in healthy hair, and the cellular cavities near the canal much more distinct than usual. That the hair neither bleeds when divided, nor is sensible, has been shown by Boyer and others. The morbid sensibility attending the complaint is seated in the scalp and hair-bulbs.

39. ii. Causes. — Plica is said to have first appeared in Poland near the end of the thirteenth century. The earliest writers on the disease speak of it as well known. It is now wearing out. It has always been more frequent on the banks of the Vistula and Borysthenes, and in damp and marshy places, than in other parts of Poland. Very rare instances of it have been met with in Holland, Saxony, and some other places in Germany. Its endemic origin seems well established. La Fontaine states that, in the provinces of Cracow and Sandomir, plica affects the peasantry, beggars, and Jews, in the proportion of two thirds in ten; the upper classes in that of two in thirty or forty. In Warsaw and the vicinity, it attacks four out of forty or forty-five of the former class; and three out of ninety or a hundred of the latter. He assigns the same proportions to Lithuania as to Warsaw, and the same to Volhynia and the Ukraine as to Cracow. Schlegel, Gasc, Hartmann, and other recent writers, consider that the disease is not nearly so frequent as here stated. This malady appears in the human species primarily; and it is said also to affect the lower animals; but there has been no proof adduced of its transmission from the former to the latter. It has been supposed to be contagious, but this opinion has been shown to have been unfounded.

40. *a.* Amongst the *remote causes* of plica, wearing the hair long and applying to it oils and ointments, often rancid (Gilibert); neglect of personal cleanliness; keeping the head warm or covered with thick woollen or fur caps; using heating aromatic substances to the head, and covering it with warm applications and dresses with the view of procuring a critical discharge from it, especially in rheumatic or other diseases of this part, are the most influential. Schlegel imputes plica chiefly to the use of semi-putrid fish, and damp residences; and doubtless these often concur with the foregoing in predisposing to, or in exciting, the affection.

41. *b.* M. Jourdan considers this complaint, in respect of *its nature,* to consist of an increase of the vital functions of the bulbs of the hair and of their secretions, with augmented sensibility. Baldinger imputes it to rheumatic acrimony, attended by an increased secretion from the bulbs. Franck, Wolframm and Larrey view it as a consequence of, or as connected with, secondary syphilis; and many of the writers referred to, as a critical discharge, determined to the hairy scalp, by the concurrence of several of the causes just enumerated. By most of the authors, however, who have closely watched this affection, it has been considered as *sui generis,* and as seated essentially in the bulbs of the hair. Schlegel, La Fontaine, Robin, Chaumeton, Mouton, and numerous others have shown, that it is not a product of neglect or dirt, otherwise it would have been seen in other countries as well as in Poland; that the bulbs of the hair exude a peculiar viscid secretion which may be seen issuing from them when the morbid hair is removed; that they are found swollen and acutely sensible; that it is often attended by a similar change in the nails; that it is frequently a marked crisis of other maladies; and that it cannot be quickly removed without danger. Much of the difference of opinion as to the origin and nature of plica, and as to the consequence of removing it, has arisen from confounding the false (§ 12.) with the true disease.

42. iii. Diagnosis.— The precursory and characteristic symptoms are such as readily distinguish true plica, from the false or the felting of the hair caused by neglect of cleanliness, &c. and from every other affection. The agglutination of the hair by a nauseous exudation from its roots, the enlargements of the bulbs, the swelling and softening of the hair itself, and the attendant alteration of the nails, are peculiar to this complaint.

43. iv. Treatment.—The occurrence of plica in persons affected with various serious diseases has sometimes proved beneficial. In such cases

it should not be interfered with, until the agglutinated mass is pushed at some distance from the skin by the growth of healthy hair. When plica is left to itself, the febrile and other symptoms very frequently disappear of themselves. After several months, or a year, or even longer, the morbid exudation decreases or entirely ceases; and as an effect of the growth of hair, the diseased portion is removed to a distance from the surface. It is only then that the Polish physicians recommend the hair to be cut. Schlegel, La Fontaine, Hartmann, Mouton, and other experienced writers contend that the removal of the diseased hair before this time has been followed by amaurosis, palsy, convulsions, epilepsy, apoplexy, and even by death. Warned by these consequences, and considering the exudation from the scalp and pilous bulbs as a poison — "*virus trichomaticus*" — the expulsion of which from the system is essential to recovery, the Polish physicians frequently carry the principle of non-interference to an injurious length. At the same time, it must be admitted that a premature removal of the diseased hair and suppression of the morbid exudation is very likely to prove injurious upon the principles stated above, and insisted upon in various parts of this work; especially if such interference be not attended, and its consequences not prevented, by the exhibition of means which will eliminate effete or morbid matters from the circulation, by increasing the functions of other emunctories, particularly of the intestinal canal, kidneys, and skin. If, therefore, the hair become dry and sound at its roots, the best informed observers agree in removing it, the head being kept moderately warm afterwards; but, as long as the bulbs continue inflamed, morbidly sensible, and exude a viscid fluid, other means of cure should be prescribed. What these means, however, are, is a matter that has not yet been fully shown; and certainly the internal remedies recommended by most of the writers on plica are but little calculated to remove the morbid conditions on which it depends.

44. The marked disorder of the digestive and excretory organs, acknowledged to attend or precede the appearance of plica, although never viewed in sufficiently close connection with its causation, indicates the propriety of directing at least a part of the means of cure to these organs. The antecedent *pica*, and the morbid states of all the secretions and excretions, show the propriety of having recourse to purgatives — chologogue, deobstruent, stomachic, and others, according to circumstances — in the treatment. It is to the general neglect, in Poland especially, of these and of other evacuations, in the early stages of acute and chronic maladies, that the occurrence of this affection is, in my opinion, chiefly to be attributed. That purgatives are of service in plica is shown by the admission of the good effects resulting from them, by Hufeland, De la Fontaine, and Küster. From the manner in which the means of cure have been recommended in works on plica, it is very obvious that most of them are employed altogether empirically. The *Lycopodium clavatum* is much used both externally and internally, but some writers consider it inert. Various preparations of mercury, antimony, sulphur, zinc, &c., have been employed; and emetics, diaphoretics, anodynes, narcotics, have severally been insisted upon. It is obvious that these may be either serviceable or injurious according to the circumstances of the case, and the manner of prescribing them. De la Fontaine and Küster prefer sulphur and antimony, and their combinations, especially the golden sulphuret of antimony. J. Franck praises sulphur and conium. For the debilitated and aged, it is obvious that tonics, or a combination of tonics and aperients, are necessary. Personal cleanliness, warm baths, and suitable diet, are also requisite.

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HEADACH. — Syn. Κεφαλαλγια (from κεφαλή, the head, and ἀλγέω, I suffer pain); Κεφαλαία, ἡμικρανια, (from ἡμι, half, and κρανιον, the skull). *Cephalalgia, Cephalæa, Hæmicrania*, Auct. Lat. var. *Dolor Capitis*, Sennert, &c. *Dolor Cephalicus*, Hoffmann. *Capiplenium*, Baglivi. *Gravedo Capitis, Carebaria*, Καρηϐαρια (from καρη, the head, and βαρυς, heavy), *Podagra capitis, Clavus, Clavus Hystericus. Mal de Tête, Céphalalgie, Migraine*, Fr. *Kopfschmerz, Hauptwehe*, Germ. *Mal* *di Capo, Cefalea,* Ital. *Pain in the Head, Megrim.*

CLASSIF. — 4. *Class,* 4. *Order* (*Good*). IV. CLASS, III. ORDER (*Author*).

1. DEFIN. — *Pain in the head, with intolerance of sound, sometimes also of light, and incapability of mental exertion.*

2. Headach has too generally been referred to disorders of those viscera of the abdomen with which the head sympathises, even when manifestly proceeding from morbid states of parts enclosed by the cranial bones. It should, however, be recollected that the primary affections of which headach has been viewed as a symptom merely, much more frequently exist without, than with, this attendant; and that, when thus accompanied, some pre-existent or contemporaneous affection of the head is often actually present, either independently, or as an intimately related complication, of these reputed primary disorders, and is only aggravated or rendered more manifest by them. Besides — and the circumstance cannot be too strongly impressed upon the young practitioner — those very disorders so generally considered the source of headach are not infrequently produced by an affection of the brain; for, pain of the head, although a common symptom of it, is neither universally nor constantly present, but is very frequently altogether wanting at an early or an advanced period; so that disease of the brain itself may in the first place disorder the digestive or other functions, this disorder reacting upon the brain, or on the nerves more immediately related to it, and exciting or otherwise altering their sensibility, so as to give rise to headach and other symptoms actually depending upon the brain, although developed and rendered manifest by the sympathetic disturbance of the digestive organs. When this takes place, the means of cure directed to the supposed primary disorder, but really to the symptomatic affection, by removing it, and by modifying the current of the circulation, frequently relieves the disease of the brain as far as morbid sensibility is concerned; and the relief is more or less complete or permanent, according as the prescribed means affect both the symptomatic and the primary disorder. That secondary or sympathetic affections are often thus mistaken for the primary will be manifest to every experienced and acute practitioner upon reading Dr. WARREN's paper on headachs; for many of the symptoms he has enumerated, as indicative of primary disorder of the stomach and intestines, are often either dependant upon the state of the circulation within the head, or associated with an affection of this part, and are resulting phenomena of previous disorder of the organic nervous system.

3. The dependence of disorder of the digestive organs and of the altered sensibility of the head upon the state of organic nervous influence has been overlooked by pathologists, owing to the brain having been generally, but erroneously, viewed as the source of nervous and vital energy, and to the dominion which the stomach has been supposed to exercise over the functions of other organs, through the medium of the brain. But it has been shown in another place (see art. DEBILITY, DISEASE, &c.), that the brain performs other offices than that of generating organic, nervous, or vital power; that it is enabled to perform its appropriate offices by the vital influence it derives from the organic nervous system; and that the stomach is dependent upon the same source as the brain for the discharge of its functions. Instead, therefore, of considering headach to proceed so frequently from disorder of the digestive organs as some recent writers suppose, I view both the one affection and the other as often associated phenomena resulting from other morbid conditions; and whilst I grant that it sometimes arises from that source, I contend that it then appears as a contingent phenomenon only, for when one part of the circle of organic nervous influence is disturbed, other parts frequently become also disordered, as hereditary constitution, previous disease, latent vice, or habits of life, may have predisposed particular organs or structures. Moreover, it seems extremely probable, that various morbid states of parts contained within the cranium are indicated by pain, before they have proceeded so far as to induce change of structure, or even without occasioning this result. The existence of altered sensibility of the ganglial nerves distributed to the head may be admitted, without any very evident alteration of the parts they supply being thereby induced. Observation has proved that the degree of pain is no index to the danger or extent of disease, as the most severe headachs are often unattended by any other evidence of organic lesion; whilst the most extensive disorganisation is frequently accompanied by little or no headach.

4. From this it will appear, that headach should be viewed as a symptom of disorder within the cranium, although not of altered structure, more frequently than it usually is; that it should be oftener assigned to a change in the organic nervous energy and sensibility in this situation; and, consequently, that it is oftener a primary disorder, than it has been generally considered. In treating, therefore, of headachs, I shall view them with strict reference to pathological states. Some of these states are such as do not admit of the headachs they produce being viewed otherwise than as symptoms; but others allow a nearer approach to a primary or idiopathic form, especially where local or general causes of exhaustion or depression occasion the complaint.

5. When called to a person suffering, or liable to, severe headach, the rational practitioner is led to inquire as to the *causes* and *seat* of pain, and as to its *nature*. But these are amongst the most difficult points to determine in practical medicine. The *causes* are most numerous and diversified; and yet they have a more or less intimate relation to the kind or form of the pain that results. The *seat* of pain is determined with great difficulty even when it admits of recognition, and, in many cases, it is impossible to ascertain it with any degree of precision. In order to arrive at a just conclusion, a number of circumstances — the history of the case with its causes and progress, the existing symptoms, and more especially those which more directly relate to the functions of digestion and excretion, and to perception, sensation, and locomotion, must be carefully observed and cautiously estimated. When the external or superficial parts of the head are chiefly affected, the exact *seat* and *nature* of the disorder are sometimes manifest.

But even in this case, the external affection may be only the consequence of previous disease of internal parts, the exact nature or seat of which can be only surmised in many instances. Disease of the membranes is generally attended by pain; but when it is chronic, and even when acute, if pressure of the brain is caused by it, no headach may be felt. When the more internal parts, especially the fibrous or medullary structure, are altered, pain is only an occasional symptom. Indeed, whenever the substance of the brain is chiefly affected, the pain should be ascribed rather to those parts of the membranes, or of the ganglial nerves supplying the brain, that had become implicated in the disease, than to the brain itself. Although it is the brain that feels alteration of sensibility induced in morbid parts, yet its own sensibility is so obscure, or so deficient, as seldom to be either excited or perverted when itself is the seat of lesion. Besides this, when the disease of the brain is attended by pain, the pain is rarely referred to the internal parts of the head, but either to some superficial situation, or to the head generally, in a confused or indistinct manner; or to some more or less distant part having an intimate nervous connection with the seat of disease.

6. The difficulty of ascertaining the *nature* of headach cannot be considered so great as that of determining the seat of it. Indeed it is often from inferences as to the nature of headach, that we are enabled to form any notion of its seat. A careful inquiry into the causes of the pain in every case, and a due estimate of the constitution, habits of life, previous ailments, and existing state of the patient, will generally enable the physician to determine as to which of the different forms of the complaint, into which I have divided it, individual cases belong. The *kind* of pain especially should be inquired into with the utmost precision. Its severity, its character, the state of the senses, and of the general sensibility, the temperature of the scalp, &c. ought to be ascertained. The *pain* may be either slight or intense, or characterised as heavy, dull, indistinct, diffused, numbing, compressive, constrictive, tensive, acute, burning, rending or bursting, or splitting, darting, lancinating, plunging, cutting, tearing, gnawing, boring, pulsating, or throbbing, &c.; but whichever of these may exist, the mode of its accession and subsidence; its duration, remissions, and exacerbations; the circumstances alleviating or aggravating it, the extent and situation of it, and its connection with affections of sight — with noises in the ears — the character of these noises — and with derangements of sensation, touch, and muscular action, in any part of the body — ought to be carefully remarked. The state of the mental operations, of the articulation, and of sleep in respect both to its manner and duration, should also receive attention. It is only from a careful estimate of these circumstances — of all the functions depending upon the cerebro-spinal system in connection with the state of the digestive, excreting, and circulating functions — that a correct opinion as to the nature of headach can be formed. There is no disorder which tries the science, experience, powers of observation, and acumen of the physician, more than this does, and there is none that requires a more precise estimate of the pathological conditions on which it depends, as a basis for safe and successful indications of cure. From this it will appear, that a comprehensive division of the varieties of headach, without being either complicated or unnecessarily minute, is requisite to the due consideration of so important a subject as this.

7. Sauvages *divides* headach into three *species*: — *Cephalalgia*, or acute headach; *Cephalæa*, or chronic headach; and *Hemicrania*, or partial or local headach. Under the *first* he enumerates the following *varieties*: the *plethoric*, *catamenial*, *hæmorrhoidal*, *dyspeptic*, *febrile*, *throbbing*, *intermittent*, *puerperal*, *inflammatory*, *catarrhal*, *nervous*, *hysterical*, and the *metallic*. Under the *second species*, he adduces the *syphilitic*, *scorbutic*, *arthritic*, *remittent*, *melancholic*, the *Polish*, or *plicose*, and the *serous*. Under the *third*, pains of the *eyes* and *sockets*, in the *frontal sinuses*, and the *catarrhal* and *hysterical*, *hæmorrhoidal*, *purulent*, *nephralgic*, and the *lunatic hæmicrania*. It is obvious that this enumeration is deserving of attention, only in as far as it shows the symptomatic states of the disease. Sagar adopts the division of Sauvages without any material alteration. J. Frank also follows it partially, and enumerates *four species*, viz. *Cephalalgia*, *Cephalæa*, *Hemicrania*, and *Clavus*. He considers that headachs, in respect of their *nature*, may be further divided into *inflammatory*, *rheumatic*, *gustric*, *arthritic*, *scorbutic*, *periodic*, *scrofulous*, *carcinomatous*, *syphilitic*, and *nervous*.

8. Dr. Good has taken a very superficial view of the pathology of headach, and the surgical Editor of his work has added nothing to the text. He divides headachs into the *stupid*, *chronic*, *throbbing*, and the *sick*, and *megrim*. Every practitioner of experience must have met with, if he have not actually experienced in his own person, headachs which at one and the same time possessed all the characters Dr. Good has enumerated as marking distinct species. Dr. Burder has given a more correct division of the complaint, but it is deficient in some important particulars. The *varieties* according to him are — *muscular*, *periosteal*, *congestive*, *organic*, *dyspeptic*, and *periodic headach*. Dr. Weatherhead divides headachs into *dyspeptic*, *nervous*, *plethoric*, *rheumatic*, *arthritic*, and *organic*. The division adopted by Sauvages is complicated, and, notwithstanding its apparent minuteness, deficient. The arrangements of recent writers are even still more defective.

9. The several varieties of headach will be more advantageously considered according to the following arrangement: — 1st, The *nervous* — from depression or exhaustion; — 2d, The *congestive*, from impeded circulation in the brain or its membranes; — 3d, The *plethoric* and *inflammatory*, from general plethora, active determination of blood to the head, or inflammatory action; — 4th, The *dyspeptic* and *bilious*, from disorder of the stomach, liver, or bowels; — 5th, The *cerebral*, from organic change within the cranium; — 6th, The *pericranial*, from disease of the pericranium, or bones of the cranium; — 7th, The *hæmicranical* or *limited*, confined to a spot, or neuralgic; — 8th, The *rheumatic* and *arthritic*; — 9th, The *periodic*; — 10th. The *hypochondrical*; — and, 11th, The

sympathetic, from disorder of the uterine and urinary organs.

10. i. Nervous Headach. — *A. Causes.* — *a.* This *variety* is mostly frequent in females, in persons of the nervous temperament, and in those possessing high susceptibility, and delicate constitutions. Venereal excesses, masturbation, intestinal worms, the abuse of calomel or other mercurials, and whatever depresses or exhausts nervous or vital energy, *predispose* to it. — *b.* It is often *excited* by exposure to cold, or to cold and humidity conjoined; by northerly or easterly winds; by the more extreme electrical states of the air, or by sudden vicissitudes of these states; by prolonged or excessive lactation; by losses of blood, menorrhagia, leucorrhæa, or other discharges; by low diet and prolonged fasting; by the depressing passions, alarm, fear, grief, and anxiety of mind; by want of sleep, or inordinate mental or physical exertion; by the improper use of mercury or other depressants, as tobacco, digitalis, &c.; by various odours or mephitic vapours or gases; and by the impure air of crowded or insufficiently ventilated rooms. Sleeping in apartments containing plants in flower, the fumes of burning charcoal, or of turpentine, and recently painted rooms not infrequently cause it. The irritation of adjoining parts, as caries of the teeth and disease of their fangs sometimes also occasion it, especially on the same side of the head as the seat of irritation. I have seen the most intense state of this affection produced by the injudicious application of cold to the head, by too copious depletion, by floodings, and by a residence in low, cold, and humid localities. Nervous headach is common to females during the catamenia, especially when excessive or too frequent. It is often, also, indirectly caused by intoxicating liquors. Heinimann very justly notices it, as a not infrequent attendant upon *general anæmia*, resulting from disease or improper treatment. I believe that some degree of *celebral anæmia* very often attends, if it does not produce, this variety of headach.

11. *B.* Nervous headach is often sudden in its attack and termination; is frequently acute, excruciating, lancinating or darting; sometimes constrictive, or attended by a sensation of the temples being pressed together; occasionally accompanied with vertigo, a feeling of sinking and dread of falling, or with great nervous agitation or restlessness, and sometimes confined or limited to a narrow space. The patient is incapable of thought and of physical and mental exertion. The sight is often dim or impaired; dark spots or meshes moving before the eyes. In some instances the eyes become sunk, and the countenance depressed or collapsed. The pulse is small, occasionally frequent, but generally languid, and always compressible. The pulsation of the carotids is small or weak. The head is cool, and the face more pallid than natural. The stomach is liable to disorder, especially to acidity and flatulence, and the bowels are often costive. This headach is frequently worse in the morning and through the day, and abates in the evening. During severe attacks, wakefulness, dizziness, loss of memory, general susceptibility of the nervous system, &c. are usually complained of.

12. ii. Congestive Headach.—The state of the circulation within the head; the manner in which the blood is returned from the brain; the partial protection of the parts contained in the cranium from the physical influences exerted upon the rest of the general surface; and the periodical changes in the position of the head, and in the exercise of the functions of the brain, would seem, on a superficial view, to favour the occurrence of congestion in this part. Yet, if these circumstances be more closely contemplated, there is at least equal evidence, that they essentially tend to preserve the brain from passive congestion on the one hand, and inflammatory determination on the other, as well as from the more serious contingencies consequent upon that minute division of the extreme vessels required for the exercise of the various cerebral functions. The congestion occasioning this form of headach is seldom general, but commonly limited to, or seated chiefly in, one hemisphere or lobe of the brain, or one or more lobes, either in their vertical or basilar aspect.

13. *A. Causes.*—Congestive headach is produced by pre-existent disorder, especially by repeated attacks of nervous or dyspeptic headach, and of active determination of blood to the brain. It often follows adynamic fevers, phrenitis, congestions of the lungs, and impeded circulation through the heart; and it is not infrequently caused by the circumstances that sometimes give rise to nervous headach, particularly the depressing passions, cold and humidity, miasmata, noxious gases, mephitic vapours, and crowded rooms. The use of opium, belladonna, aconitum, and other narcotics, occasionally also produces it, especially in certain idiosyncrasies, or in large doses. Tight neckcloths, stooping, and a too low position of the head during sleep, also occasion it. The headachs following the inordinate use of intoxicating liquors are to be referred to this and the preceding variety, rather than to disorder of the digestive organs or any other pathological state. Prolonged or intense mental occupation often gives rise to congestive headach; the repeated or continued determination of blood to the brain, thereby produced, passing into congestion, owing to exhaustion of nervous power; and this state, if allowed to continue, or frequently produced, often terminates in apoplexy or palsy. This variety is most frequently observed in persons advanced in life, and in those who have exhausted their vital energies and injured their constitutions by dissipation or intemperance.

14. *B.* The most *characteristic symptoms* of this variety are — the dull, gravative pain, and sense of weight in the head; frequently stupor, heaviness, or giddiness; dimness of sight; buzzing, ringing, or humming noises in the ears; and heaviness or pallor of the countenance. The pain is often referred to one part of the head chiefly, probably owing to the congestion being greater in one part than in another (§ 12.). The patient experiences great increase of vertigo when looking up, or when stooping or looking down from an eminence; he sometimes complains of a sense of coldness in the head, of fatigue or prostration of strength, coldness of the extremities, and of susceptibility of the nervous system. Sleep is often sound, heavy or snoring; occasionally it is disturbed or restless, and attended by dreams, or by convulsive movements. The spirits are depressed, or almost hypochondriacal. The pulse is languid, weak, or small, occasionally accele-

rated. The bowels are torpid, and the biliary secretion deficient or morbid. The urine is loaded, and deposits a copious sediment.

15. iii. Headach from Plethora and increased Vascular Determination or Action.— *A. The predisposing causes* of this variety are — the earlier and middle periods of life, the male sex, plethoric habits of body, sanguineous and irritable temperaments, full living, indolence, indulgence in bed, neglect of regular exercise in the open air, and mental exertion.—*B. The exciting causes* are — all the circumstances which either increase the vascular plethora resulting from the predisposing causes, or determine an increased flow of blood towards the head, especially, neglect of accustomed depletions; the suppression of discharges and eruptions, particularly of epistaxis, the catamenia, and hæmorrhoids; exposure to the sun; intemperance in eating or drinking; premature or inordinate mental culture, and exercise of the intellectual powers; every kind of mental excitement, fits of passion; the supine posture with the head low; wearing strait corsets; too long hair, or the removal of it; overheated or overcrowded rooms or assemblies; prolonged or unaccustomed continence, and the causes usually occasioning inflammation of the brain or of its membranes, or determination of blood to these parts. (See art. Brain, § 182.)

16. *C.* The *Symptoms* in this variety sufficiently indicate the cause of the headach; but they differ very much in different habits, temperaments, and ages.—*a.* In young persons, the pulse is strong, or full, somewhat accelerated; the head is hot, the countenance flushed, the eyes more or less suffused and heavy; and the pain is rending, severe, sometimes pulsative or throbbing, occasionally with a beating noise in the ears, and felt chiefly in the forehead and temples. The bowels are costive; and the patient is depressed, heavy and indisposed to exertion. *b.* In delicate or young persons, whose mental faculties have been prematurely exercised, or exerted to the neglect of the physical powers, the slightest excitement and the most trifling causes will produce headach, with coldness of the extremities, and great susceptibitity of the nervous system, especially of females. The principal flux of the circulation takes place to the head, and the functions of other parts are performed imperfectly.—*c.* In persons of the middle age, or beyond it, and especially in those who have lived fully or intemperately, the headach is heavy, rending, or throbbing; often general, or referred chiefly to the occiput; attended with increased heat of the scalp, with distension of the veins about the temples, with fulness or redness of the eyes, and sometimes also of the whole countenance. The face is occasionally bloated, and its expression heavy; the pulse is full, strong, and oppressed, or slower than the usual standard; the bowels are torpid, the liver inactive, and the urine high-coloured or loaded. Sleep is heavy, but often disturbed. In some cases, however, with all, or nearly all, these symptoms, the patient is excited, or restless, is watchful, or sleeps but little, or is irritable, and the pulse is slightly accelerated; the excretions being scanty. In the first and second classes of persons, this form of headach not infrequently precedes inflammation of the brain and membranes, or effusion from the latter: in the third class, it more frequently ushers in apoplexy or palsy.

17. iv. Dyspeptic and Bilious Headachs.— *A.* This variety of headach is very nearly allied to the nervous and congestive, and it has been confounded with these in the description of it given by Dr. Warren. From the circumstance of sickness or vomiting being a frequent symptom, the term *sick headach* has been commonly applied to it. But I am convinced that this symptom often depends upon the brain, and that many cases, which have been viewed as merely instances of sick headach, have actually been cases in which the affection of the brain had been attended both by sickness and by headach (§ 2. *et seq.*). This form of disorder frequently affects dyspeptic persons who have been longer than usual without food, or who have committed even slight errors of diet, and whose bowels are habitually sluggish. It may occur, as Dr. Burder remarks, without any obvious susceptibility of the brain; or in persons who can bear close application to study without inconvenience as respects the head, and yet who are liable to headach after taking certain articles of food, or mingling them in too great variety.

18. Dyspeptic headach, particularly when attended by nausea or vomiting, is observed chiefly in persons subject to mental or cerebral excitement, and in whom the gastric disorder, as well as the pain of the head, are only effects of that excitement. In these, the stomach is either irritable, or weak, or even both, and unfit to perform its functions, as well as very liable to become further disordered by slight causes. Stomach headach generally affects the forehead on one temple, particularly the left; but it often extends over most of the head. When the left temple is chiefly affected, tenderness of the left eye is frequently also felt. The pain is dull, heavy, or oppressive, or acute, sharp, or darting. The mental faculties are somewhat weakened, and exertion of the mind is irksome. Tenderness of the scalp is seldom present, unless in a slight degree, or in connection with rheumatism. This variety of headach usually commences when the patient first wakes. It is then oppressive, heavy, or diffused. Nausea often supervenes, and sometimes vomiting. When the pain is slight, it generally subsides after breakfast; but if retching occurs, it continues longer, or until offending matters are thrown off, and then becomes more limited or concentrated. The remains of an undigested meal, or merely an insipid fluid, mixed with frothy mucus, is at first ejected. But if the vomiting continue, bile is frequently discharged. In some instances, an acid or acrid fluid, or greenish bile, is vomited, when pain and all the symptoms disappear. If the attack be not arrested by suitable means, or by the spontaneous vomiting, the pain often increases as the day advances, until stimulating food or beverages taken into the stomach, or sleep, allays it; but it may return the following day. Dyspeptic headach, however, may take place much more slightly and transiently; or it may assume a more chronic or continued form. It may follow a principal meal, and cease in two or three hours; or it may not occur until several hours after a meal. The pulse is languid or feeble, seldom accelerated. The tongue is white, loaded, particularly towards the root;

and its edges are slightly red, and often indented by the teeth. The bowels are usually costive. Vision is frequently indistinct; and coldness or slight numbness of the fingers is sometimes complained of.

19. *b.* It has been supposed by Dr. Warren and Dr. Paris, that, when the headach does not occur until several hours after a meal, and particularly when uneasiness or a sense of distension is felt in the situation of the duodenum, it depends upon irritation of this viscus. The circumstance of an emetic often failing to afford relief in such cases, or to evacuate any thing material from the stomach, whilst a dose of rhubarb and magnesia, or of any other purgative, generally removes both the headach and the uneasiness in the course of the duodenum, has been considered as proof of the dependence of the affection of the head upon disorder of this bowel. Without questioning the existence of functional disorder of the duodenum in these cases, the origin of the headach in that disorder does not necessarily follow. Both affections, most probably, depend upon the same pathological states; and it is, moreover, extremely likely that the derangement of the duodenum extends more or less to both the stomach and liver. The symptoms which the writers just referred to consider characteristic of headach proceeding from disorder of the upper portion of the intestines, — particularly chilliness of the body, coldness and dampness of the hands and feet; severe pain of the head, with a sense of coldness and tightness of the scalp; slight giddiness, with weight, distension, and stiffness of the eyeballs, and the appearance of brilliant ocular spectra; and sometimes tingling and numbness of the fingers and hands,— arise as much from disorder of the stomach or liver, or both, as from derangement of the duodenum and upper parts of the intestines. More dependence may, perhaps, be placed upon flatulency and the sensation of dryness and inactivity of the bowels noticed by Dr. Paris, and upon the presence of nausea without vomiting; but it is most probable that the altered sensibility referred to the head, equally with the symptoms just mentioned, depends primarily upon the state of organic nervous influence.

20. *B.* Biliary derangement is generally connected with more or less disorder of the stomach and bowels: the affection of the one may have extended to the other; or all may have been simultaneously disturbed by causes affecting the nervous or the vascular systems. In either case, the disturbance is not infrequently also extended to the head, and partly manifested by pain in this situation, particularly in the forehead, eyebrows, and orbits. — *a.* The headach may proceed from an interrupted discharge of bile into the duodenum, and a consequent accumulation of it in the gall-bladder or hepatic ducts; the morbid impression thereby made upon the organic nervous system affecting the head, and often, also, other remote parts. When the headach arises from this state of disorder, vascular action is generally weak, languid, or depressed, the tongue loaded or white, the skin harsh or unhealthy in its hue, and the functions of digestion and fæcation impaired. In these cases, flatulence, coldness of the extremities, and a sense of smarting in the eyes and eyelids, or pain in the eyeballs, are often, also, complained of.

21. *b.* In some instances, headach proceeds from an exuberant secretion of bile, or from the irruption of morbid bile into the duodenum; but, in most of these, there are increased vascular action and heat of skin, with nausea and bilious vomitings. The face is flushed, the eyes suffused, and the pain is throbbing or rending. The evacuation of bile often gives relief; but the retchings sometimes keep up the secretion, or promote the discharge of it; and the digestive mucous surface, and the nerves supplying it, being thereby irritated, vascular action becomes excited, and the sensibility even of remote parts more or less altered: pains of the head, loins, and limbs are thus induced.

22. *C.* The *Causes* of dyspeptic and bilious headach have a very intimate relation to the predisposition or susceptibility of the nervous systems and digestive organs to excitation or irritation. — *a.* Such susceptibility very often exists in a high degree in persons of sedentary and studious habits. Intense application of the mind, the anxieties of parents, the eager pursuit of business or of gain, the speculations of merchants, the gambling transactions of the stock markets and of club-rooms, &c., keep the mind in an almost constant state of excitement, determine an augmented flow of blood to the brain, and thereby increase the irritability of the stomach, and predispose both organs to be disordered by the slighter causes to which the latter is so much exposed. As vital power becomes weakened, the susceptibility of the cerebro-spinal nervous system is increased, and the sensibility of it more readily disturbed. The digestive and assimilative functions are also weakened, and more prone to disorder, which not infrequently affects the brain, especially when its circulation has been excited, or kept in an almost constant state of erethism, by the circumstances just adverted to. Dyspeptic headach is most common in the young or middle aged. The bilious variety is most prevalent during summer and autumn.

23. *b.* The *exciting causes* are — errors in diet, especially too great a variety or quantity of food; indigestible, acrid, cloying, rich, or heavy articles; too long fasting; the excessive use of diluents or of stimulating or intoxicating beverages, particularly of spirituous liquors; costiveness or constipation, and the irritation of morbid secretions and fæcal matters retained in the bowels. In young persons, especially, headach and increased determination of blood to the head are frequent consequences of costiveness, of collections of sordes or of fæcal matters in the digestive canal, and of intestinal worms.

24. v. Headach from Organic Changes. — In the early stages, this form of headach can hardly be distinguished from the other varieties; indeed, organic change not infrequently originates in some one of the pathological states of which headach is an occasional attendant. But, whilst in all these varieties the pain is only sometimes present, or is, at least, entirely absent for considerable periods, that produced by organic lesion is nearly constant or continued, or merely remits, without altogether disappearing. The alterations which are attended by headach are numerous; indeed, all those enumerated in the articles Brain (§ 3—133.), and Cranium, may give rise to it; but the most common are tumours of various kinds, hydatids,

exostosis from the inner surface of the cranium, ossific formations, softening of the substance of the brain, suppuration, adhesions of the membranes; tubercular, cancerous, fungous, and malignant productions, &c. Besides these, aneurismal or ossified arteries, varicose or inflamed veins, obstructions in the sinuses and veins; concretions, albuminous exudations, or purulent matters in these vessels (Lieutaud, Borsieri); enlargement of the pineal or pituitary glands, serous effusion, &c., have been observed.

25. The pain caused by any of these lesions is generally fixed, often referred to the same spot, continued, and deep seated. It is independent of the other causes of headach, although aggravated by them, by mental application, by stooping, and by stimulants. Dr. Burder justly remarks, that cheerful conversation, that would chase away, or at least suspend, the feeling of ordinary headach, often becomes insupportable in this variety. When the disease is farther advanced, even a slight motion of the head, or rotating it, often gives rise to extreme suffering, and sometimes to vomiting. The affection of the stomach dependent upon the cephalic lesion frequently occurs without any obvious cause, or independently of apparent disorder of the stomach itself, or of any error in diet; and the pain of the head remains when the sickness ceases. Although the pain is generally constant, yet remissions are sometimes felt, or even short intermissions, especially early in the disease. This is even the case when the lesion is malignant or carcinomatous, or consists of fungous tumours; and the pain is usually then lancinating, stounding, or darting, and referred to a particular spot. In the advanced stage of organic headach, spasmodic contractions of the limbs, vertigo, convulsions, paralysis, or idiotism, frequently supervene. When the lesion is of a malignant or contaminating nature, the surface generally assumes a pale straw-coloured hue, or is obviously cachectic. Neuralgic pains in the face, or in more remote parts, darting pains in the limbs, are also occasionally present in this variety. (See arts. Brain — *Softening of, &c.*, and Palsy.)

26. vi. Headach from Disease of the Periosteum and Cranial Bones. — This variety is not often met with. Cases of it have been recorded by Mr. Crampton, Sir E. Home, Dr. Abercrombie, and others; but the best description of it is given by Dr. Burder. — *a.* Affection of the *periosteum* is usually *caused* by exposure to cold, to currents of air, to humidity, and vicissitudes of temperature and weather. The pain is tensive, remitting, and increased by pressure, and by the action of the temporal or occipito-frontalis muscles. There are sometimes fever and excited action of the vessels of the head, with increase of the heat of the scalp. A constrictive pain is caused or aggravated by going into a cold room, or by removing the usual covering from the head. Dr. Burder observes, that this variety of headach occurs only in those who have suffered from continued cerebral excitement; and that it is commonly dependent upon a highly susceptible, or preternaturally vascular, condition of the brain or its membranes, such as is often induced by long-continued study, by mental irritation, or by gastric or hepatic disorder, connected with debility or exhaustion. If a person, whose nervous or vital powers are thus impaired, and whose brain and membranes are rendered susceptible and vascular, is exposed to the exciting causes just mentioned, periosteal cephalalgia of great severity or obstinacy is often produced; the external affection, with the consequent irritation and want of sleep, aggravating the morbid condition of the brain and membranes. The cases which I have seen have been chiefly in persons of the scrofulous diathesis.

27. Cases of fixed pain of the head, and tenderness of a portion of the scalp, with thickening or swelling of the integuments, have been observed by the writers just mentioned, and by Mr. Pearson and Sir C. B. Brodie. I have seen instances of this affection originate in *otitis:* one of these was in a medical friend, who consulted also Dr. J. Johnson and Sir C. B. Brodie. The external disorder followed the use of the cold douche or shower bath, recommended for the removal of increased vascular action and heat of the scalp indicative of cerebral excitement. — Division of the pericranium in these cases has generally shown thickening of the periosteum; and even disease of the bone in a few instances.

28. When headach is owing to a diseased state of the bones (see art. Cranium), there are constant pain and tenderness of a particular spot. Some of these cases originate in syphilitic or mercurial cachexia. Others proceed from inflammation of the ear, and are connected with chronic discharges from this organ, or consist of caries of a portion of the petrous bone, or of the mastoid process. In the cases of this kind which I have seen, there was partial paralysis of the face, with excessive swelling around the ear, especially below it, and extending even to the eye. I attended one of these cases with Mr. Barnwell; and another was seen by Sir C. Bell and myself, and is noticed in his work on the nervous system. Similar instances are recorded also by J. Frank and others.

29. vii. Rheumatic and Arthritic Headach. — *A. Rheumatic Headach* is usually *caused* by exposure to cold, or to cold and humidity, or to currents of air; by uncovering the head when perspiring; by sleeping on a damp pillow; by the passage of air through a carriage window; by sudden vicissitudes of temperature or of weather, especially by easterly or northerly winds. But a *predisposition* arising out of the rheumatic diathesis, or of disorder of the digestive organs — particularly torpor of the liver, accumulations of bile in the bile passages, and collections of sordes in the intestinal canal — is often necessary to the production of this affection of the head.

30. Rheumatic headach is often preceded by a sense of coldness over the head and face, especially on one side. It is seated chiefly in the aponeurosis of the occipito-frontalis and temporal muscles; but it is not always confined to this structure, it being sometimes associated with increased vascular determination to the membranes of the brain. The pain is severe, heavy, distracting, or aching, and in its uncomplicated state is attended by a sense of coldness, by great tenderness of the scalp, by rheumatic pains extending down the neck, or in one side of the neck, or in one shoulder, or in the face; sometimes by copious perspirations; and more rarely by rheu-

matic inflammation of one or both eyes. It is generally aggravated in the evening, and alleviated in the morning, and by warmth. There is no increase of the temperature of the scalp, or augmented action of the arteries of the head, unless the affection be complicated with excited vascular action in the internal membranes. If it be thus complicated, these symptoms are also present; and, as Dr. ELLIOTSON justly observes, there are likewise giddiness, drowsiness, and internal throbbings. This associated disorder is seldom ameliorated by warmth; and the face is often flushed, the eyes injected, and the vessels loaded.

31. B. *Arthritic Headach* is met with in persons who are subject to the irregular forms of gout; and, in those who have an hereditary or an acquired predisposition to this malady, it may be the first manifestation of the gouty affection. Of this I have seen more than one instance, both in males, and in females about the change of life. It is not an unusual form of misplaced or of retrocedent gout, in persons who have had the disease in its more regular forms, but who neglect the air, exercise, and regimen necessary to the developement of a regular paroxysm; and it is often a dangerous affection. The pain is severe, and attended by a sense of fulness and of heat or burning in the head; by remarkable tenderness, and by increased heat of the scalp; by giddiness, dimness of sight, and fear of approaching insensibility, especially upon stooping; by sounds in the ears, great acuteness of hearing, and intolerance of noises; by flushes of heat in the face; by irritability of temper and restlessness; and by confusion of thought and loss of memory. There are also flatulence and disordered digestion; costiveness; a morbid state of the stools, and of the biliary secretion; and scanty high-coloured urine, which deposits a copious reddish sediment. The tongue is generally loaded, and its papillæ excited; and the pulse is either natural, as to frequency, and full, or accelerated and hard, or oppressed. If this affection is not removed, it may pass into effusion, with comatose or apoplectic symptoms. (See GOUT—*Irregular Forms of*, § 16.)

32. viii. INTERMITTENT HEADACH — *Cephalalgia Periodica*, Auctorum — *Febris Intermittens cephalica larvata*, J. FRANK — usually presents the same characters as the functional varieties already described, especially the nervous and dyspeptic, and differs from them only in respect of periodicity. But it may be not merely functional; for the pain caused by chronic inflammation of the membranes, or even by organic lesion within the cranium, may assume, at their early stages, an intermittent type. A strict investigation of the causes, and of the states of the various functions, is therefore requisite to a knowledge of the nature of the affection. When the headach proceeds from terrestrial exhalations, or from cold, raw, easterly or northerly winds, and attacks persons who have been affected with agues or remittent fevers, it generally returns daily, either in the morning or about noon; but it may observe a tertian or quartan form. It is often limited to a particular part of the head, — frequently to the forehead, or to one brow, or to the brow and orbit — brow-ague. It is sometimes seated in one half of the head. The pain is occasionally so severe and so limited in extent, as closely to resemble neuralgia. Indeed, intermittent headach and neuralgic affections almost insensibly pass into each other; the paroxysms of the latter being, however, much more intense and of shorter duration than those of the latter; and they both frequently proceed from the same predisposing and exciting causes, namely, disorder of the stomach, bowels, and biliary organs, and exposure to malaria, or to cold damp winds, &c.

33. ix. HYSTERICAL AND SYMPATHETIC HEADACH. — The pain in the head is one of the numerous forms in which hysteria manifests itself. It is generally limited to a small space, or to a single spot; and is often described as resembling a wedge or nail driven into the cranium or pressing upon the brain — *Clavus*, &c. It is commonly sympathetic of irritation of the uterine organs, and associated with irregularity of the uterine discharge — with painful, scanty, or excessive menstruation, or with leucorrhœa; and with flatulent borborygmi, or with the globus hystericus. I have seen it also connected with *worms* in the intestines, with the irritation of calculi in the kidneys, and with tenderness, and other indications of inflammatory irritation, of parts of the spinal chord and membranes. — Indeed, affections of the spine seldom exist without pain in the head, in some one of its forms, being occasionally felt.

34. x. HYPOCHONDRIACAL HEADACH. — Pain of the head is often one of the most distressing symptoms of which hypochondriacal and melancholic persons complain, and is exaggerated by them into the most intense suffering that can be imagined; and yet, when heir attention is directed to other objects of interest, or when they are otherwise excited, this part of their miseries seems altogether forgotten, or for the time removed. Their minds brood upon the cause and consequences of the pains referred to this situation, until they firmly believe the very worst results. A patient, some time since, called upon me to know whether or not I considered the pain to depend upon organic change; and, although my opinion was that this was not the source of the affection, yet several visits were afterwards made to me with the same object. Another more recently came under my care, with the firm belief that the headach would terminate in insanity or idiotism. Such cases are, however, not rare; and although the fears, which subsequently become the firm convictions, of the patient, are fulfilled in some instances, or even impel them to suicide in others, yet recovery is not infrequently effected by judicious treatment and management. The source and character of the pain in such cases are ascertained with difficulty, as the patients' accounts are often exaggerated; but are most frequently dependant, as far as I have observed, upon the state of the nervous system, in connection with chronic disorder of the digestive canal and biliary organs. The organic nervous energy is manifestly impaired, and all the functions which chiefly depend upon it. But I have seen cases furnishing evidence of congestion, or of chronic inflammatory action, of the brain or of its membranes, and have found a treatment based on this view more or less beneficial.

35. xi. OF HEMICRANIA, AND PARTIAL AND NEURALGIC HEADACHS. — These can scarcely be considered as distinct varieties of headach, inasmuch as the pains proceeding from the patholo-

gical states which have been passed in review are very frequently limited in extent, or confined to one side of the head, or affect it chiefly. This is especially the case with the dyspeptic, the bilious, the organic, the nervous, the rheumatic, the intermittent, and the hysterical varieties; and it is still more so in respect of that, upon which a few observations remain to be made — the *neuralgic*. — *A*. This variety is characterised principally by the intensity of the pain, which is confined to a single spot, or extends in the course of a single nerve. The pain comes on in violent paroxysms, is of short duration, and is followed by distinct, and often by considerable, intermissions. There is generally increased sensibility or tenderness of the scalp around the seat of suffering; and the digestive organs often betray disorder. The nervous system is susceptible and weakened. The pulse is seldom materially disturbed. This is only one of the numerous situations in which NEURALGIC AFFECTIONS (see the article) manifest themselves.

36. *B. Partial or limited Headach* is often excited by local causes of irritation. — Very severe pain in the situation of the frontal sinuses has been experienced, owing to the ova of insects having passed by the nostrils to this part. PLOUCQUET gives numerous references to cases where the larvæ of insects had occasioned intense pains. A servant in my own family suffered from this cause, the larva being discharged upon a violent fit of sneezing. Caries or disease of the fangs of the teeth is often the cause of partial headach, the pain being sometimes confined to a single spot on the same side of the head as that in which the cause of irritation is seated.

37. xii. DIAGNOSIS. — There is no class of affections which requires greater discrimination than this; and there is, perhaps, none which is esteemed more lightly by practitioners, or more empirically treated; the digestive organs being considered much too generally as the source of disorder. I believe that a careful investigation of the cases, and close observation of the juvantia and lædentia, will show that a greater number of them depend upon chronic inflammation of the brain, or of its membranes, than is commonly supposed. The diagnostic symptoms of each variety have been enumerated in the description of it; but the following summary may be given at this place: — (*a*) *Nervous headach* is distinguished by absence of constitutional disorder, by susceptibility of the nervous system, by the feeling of constriction, and the limited extent of the pain, by the natural temperature of the head, &c. (§ 11.). — (*b*) The *congestive* is characterised by the numb, dull or heavy, oppressive, and deep-seated pain; by languor of the circulation; by pallor or heaviness of the countenance; by dizziness, drowsiness, and want of animation; by the coolness of the scalp, and sometimes by fulness of the eyes and a bloated state of the face (§ 14.). — (*c*) *Plethoric* and *inflammatory headach* is manifested by the general, severe, rending and throbbing pain; by nausea or vomiting; by fulness of the vessels, or flushing of the face and eyes; by the full, hard, or oppressed pulse; and by the increased temperature of the head (§ 16.). — (*d*) The *dyspeptic* and *bilious* is evinced by dull, aching, or racking, or shooting pains, which move from one part to another, and are often attended by soreness of the scalp, by disorder of the digestive organs, and flatulence; by a loaded tongue, foul breath, and a morbid state of the secretions, especially the biliary (§ 18 – 21.). — (*e*) The *organic* is distinguished by internal acute pain, which becomes more and more constant or prolonged; by sudden retchings; by a quick, irritable, or irregular pulse; by the pain darting or shooting from one situation; by tenderness or soreness on pressure being felt, particularly when the bones are affected; by alterations in the sensibility and motions of a limb or limbs; and by symptomatic pains, spasmodic contractions, &c. (§ 25.). — (*f*) *Rheumatic* and *arthritic headachs* are readily recognised from the diathesis of the patient, and from the causes and characters of these affections. The rheumatic is generally connected with rheumatism of an adjoining part (§ 30.). The arthritic presents symptoms that cannot be mistaken, especially when viewed in connection with the history of the case (§ 31.). The description of these, and of the other forms of headach, has been so fully given, that nothing further respecting their diagnosis is requisite.

38. xiii. PROGNOSIS. — A favourable result may be anticipated of cases of the nervous, the dyspeptic, the bilious, the rheumatic, the aguish, and the hysterical headach. A guarded opinion should be given respecting the inflammatory, the arthritic, and the rheumatic when associated with increased vascular action in the internal membranes (§ 30.). When headach is accompanied with vomiting, without obvious disorder of the stomach having preceded the attack, an inflammatory affection of the brain should be suspected; and a prognosis, conformable with this view, ought to be given. A still more unfavourable opinion should be entertained if the locomotive powers, if the memory, if the senses, or if utterance or articulation become impaired. If there be sufficient evidence of disease of the brain, or of its membranes, great danger exists, although a fatal termination may be long delayed, or even deferred for some years, as in cases of palsy. If the pericranium be affected, and especially if the bones of the cranium be diseased, a very guarded, if not a very unfavourable, prognosis is necessary.

39. xiv. TREATMENT. — It is evident that the indications for the cure of headachs should be inferred from the nature of each; that remedies ought to be directed to their pathological conditions and relations, ascertained by a close examination of the states of the organic and locomotive functions, of the senses, and of the mental manifestations. And, although what has been advanced above may aid the inexperienced, or furnish useful suggestions to many, yet the successful administration of remedies in these affections will entirely depend upon accuracy of observation, and upon pathological and therapeutical knowledge previously acquired. — *A. Nervous Headach*, proceeding from depression or exhaustion, obviously requires the nervous energies to be restored by tonics and stimulants. These medicines, however, should be administered with due caution at first; as the more active of them, or too large doses, may excite fever, or even occasion vascular determination to the head. They ought not to be given, or continued long, until fæcal accumulations have been re-

moved by mild or stomachic purgatives, which should afterwards be prescribed occasionally, in conjunction with deobstruents, in order to preserve the excreting functions in a state of healthy activity. Whilst the head ought not to be kept too warm, the impression of cold must be prevented, at least until the organic functions have acquired their usual tone. In most instances, the milder tonics may be given, with the alkaline subcarbonates, or the aromatic spirit of ammonia, and with carminatives. The diet should be light and nourishing, the occasional causes avoided, and gentle exercise in the open air daily taken. In slight cases, these means, and a due regulation of the digestive functions, will remove the disorder; but, if they fail, those about to be noticed should be resorted to.

40. Nervous headach may prove obstinate, or it may be unusually violent from the commencement, or gradually become so. If, in these cases, the symptoms, especially those connected with the organic functions, the senses and cerebral manifestations, evince neither vascular action nor organic lesion within the cranium, tonics conjoined with anodynes, antispasmodics, or carminatives, according to the peculiarities of the case, should be resorted to. The preparations of cinchona, of valerian, of arnica, of assafœtida, and of ammonia; camphor in full doses; the æthers; the carbonate of iron, the nitrate of silver, &c., are then severally indicated, and may be given with opium, or with the acetate or muriate of morphia, or with hyoscyamus, or with belladonna, according to circumstances. If there be prolonged watchfulness, a suitable narcotic should be exhibited at, or shortly before, bedtime. I have found the following medicines of great benefit in some very severe cases of this kind, the pills (No. 245.) having been taken, in addition to the mixture (No. 246.), during the violence of the attack. An increased dose of the pills, or the anodyne draught, may also be given at night. *Formulæ* 24, 25. 36. 269. 367. 423. 539. 555. prescribed in the *Appendix*, also, may prove useful in this variety of headach.

No. 245. ℞ Camphoræ rasæ gr. xij.—xviij.; Extracti Hyoscyami ʒ ss.; Conserv. Rosarum q. s. ut fiant Pilulæ xij., quarum capiat duas, quartâ vel quintâ quâque horâ.

No. 246. ℞ Infusi Valerianæ ʒ x.; Sodæ Sub-carbonatis gr. xij.; Spiritus Ammoniæ fœtid. ʒ j.; Spiritus Lavand. Comp. ♏ xx.; Tinct. Aurantii Co. ʒ j. M. Fiat Haustus, quartis, quintis, vel sextis horis sumendus.

No. 247. ℞ Quininæ Sulphatis, Camphoræ rasæ, āā gr. x.; Extr. Aloës purif. gr. xij.; Extr. Hyoscyami ʒ ss.; Mucilag. Acaciæ q. s. M. Fiant Pilulæ xxiv., quarum capiat unam, vel duas, vel tres, bis terve in die.

41. B. *Congestive Headach* should be treated according to the age, habit of body, and constitutional power of the patient; and to the local as well as general state of the circulation. It should not be overlooked, that vascular action in the brain, owing either to impaired vital power of the capillaries, and of the organ generally, or to impeded return of blood by the veins and sinuses, is insufficient for the due performance of the several functions of this part of the frame. — *a.* In *delicate* or *irritable* persons, stomachic or mild purgatives, tepid or cold sponging the head with fluids containing aromatic and fragrant substances, as lavender or Cologne water; derivatives, especially warm or stimulating pediluvia; the internal exhibition of camphor, ammonia, valerian, gentle tonics, &c.; light diet, and moderate exercise in the open air; will prove most serviceable. Local bloodletting will seldom be required, even in small quantity; blisters behind the ears will be productive of benefit, in some cases; and the effusion of tepid water on the head, in others. As the patient's strength improves, cold sponging the head or the shower bath, and friction of the scalp, will be useful in preventing a return of the affection. Where there is much irritability, the combination of hyoscyamus, or of small doses of the powder or extract of belladonna, with the medicines just named, and strict attention to diet, air, and exercise, will generally be found of advantage.

42. *b.* When this form of headach affects persons whose vital powers have been exhausted by dissipation and unrestrained indulgences, or those of a leucophlegmatic habit of body, the treatment should be still more restorative, tonic, or stimulant than the foregoing (§ 41.). Even local depletions will be injurious, and the cold affusion on the head will be of little service, unless the affection has followed the use of narcotics, or when the head is hot. Cordial stomachic aperients, warm spiced wine, or coffee; the preparations of ammonia, or of camphor, or of valerian, or of arnica, &c.; stimulating pediluvia; and blisters behind the ears, or on the temples, or even on the head, in extreme cases; are amongst the most appropriate remedies in cases of this kind. After these have relieved the more distressing symptoms, the complete removal of the disorder, and the prevention of a return of it, may be attempted, by promoting the digestive, the assimilating, and the excreting functions; by the use of tonics — of the preparations of bark or of iron; and by mild chalybeate and aërated mineral waters. But, before these are prescribed, the secretions and excretions should be freely evacuated, and their morbid states corrected, by alteratives and mild purgatives (F. 205. 266. 430.). And, during the course of restorative medicines, these should be frequently resorted to. The factitious mineral waters of Carlsbad, Marienbad, or of Pyrmont or Spa, subsequently may be cautiously tried; but those of Seidschutz or Pullna should, in many cases, precede the use of these.

43. *c.* When congestive headach occurs in the plethoric, the indolent, and well-fed; in persons about or past middle age, or who have experienced obstructions of the liver, or of any accustomed evacuation; the treatment should be very different from the above. General or local bloodletting, the affusion of cold water on the head, brisk cathartics, and derivation to the extremities by warm and stimulating pediluvia or manuluvia, are chiefly to be depended upon. But these will fail of being permanently useful, unless the diet of the patient be restricted, and regular exercise be taken in the open air. The secretions and excretions ought, also, to be freely and regularly promoted. A daily recourse to the shower bath will prove of great service.

44. *d.* When this form of headach proceeds from prolonged or intense mental application or exertion, not only should the above means be adopted, according to the age, strength, habit of body, and modes of living of the patient; but entire relaxation of the mind, change of air, travelling, the amusements of watering places, sea-voyaging, early hours, light reading, and

horse exercise, should be enjoyed, as circumstances may permit. At the same time, the mineral waters most suited to the peculiarities of the case may be taken, especially those that are deobstruent, aperient, and gently tonic; and, whilst the functions of digestion and assimilation are promoted by restoratives, and by breathing an open dry air, the secreting and excreting actions of the abdominal viscera should receive strict attention.

45. *C. Plethoric* and *Inflammatory Headach* requires the adoption of the means just enumerated (§ 43.), but in a much more active manner. The regimen ought to be strictly antiphlogistic; and permanent derivation, or counter-irritation, established by means of issues or setons in the nape of the neck, or of the tartar emetic ointment, or of croton oil, applied in this situation and in its vicinity. The bowels ought, also, to be copiously and frequently acted upon. When this form of headach follows the disappearance of accustomed discharges or eruptions, or of hæmorrhages, this treatment should be most strictly enforced, and the use of external as well as internal derivatives strenuously persisted in. (See Brain — *Congestion of*, § 139., and *Inflammation of*, § 191.)

46. *D. Dyspeptic* and *Bilious Headachs.* — *a.* The *former* will be remedied by the means advised in the article on Indigestion. I may, however, state in this place, that, when this headach is attended by nausea, and when it is clearly ascertained that the sickness does not proceed from inflammatory action within the cranium, an ipecacuanha *emetic*, vomiting being promoted by drinking chamomile tea or warm water, will generally give relief. After the stomach is evacuated, and the nausea is gone, a mild purgative, as the compound rhubarb pill; or the sulphate of magnesia, with carbonate of magnesia and a carminative spirit or tincture in an aromatic water; or rhubarb with magnesia or an alkaline subcarbonate, and any aromatic or carminative medicine, will give further relief, by changing the state of the secretions in the stomach and upper part of the intestines, and by promoting the excreting functions of the latter, and of the large bowels. If nausea be not present, these purgatives should be given forthwith, and repeated until the bowels are freely evacuated. Suitable light diet, exercise in the open air, and an occasional recourse to these or similar aperients, will prevent a return of the affection. I have found the following most serviceable, when given with this intention, in moderate doses. In larger doses, they will also remove the complaint.

No. 248. ℞ Pulveris Rhei ʒss.; Extr. Fellis Bovini, Extr. Aloës purificati, āā ℈j.; Saponis Duri gr. xv.; Pulv. Ipecacuanhæ, Pulveris Capsici, āā gr. xij.; Balsami Peruviani, Olei Carui, āā gutt. viij. Contunde benè simul, et massam divide in Pilulas xxxvj., quarum capiat unam vel duas, cum prandio, vel horâ somni.

No. 249. ℞ Infusi Gentianæ Comp., Infusi Sennæ Comp., āā ℥iij.; Sodæ Sub-carbon. ʒij. (vel Magnesiæ Sulphatis ʒvj.); Tinct. Jalap. ʒjss.; Tinct. Sennæ, et Tinct. Cardamom. Comp., āā ʒiijss. M. Fiat Mist., cujus capiat Coch. iij. ampla horâ somni, vel Coch. iv. primo mane.

47. *b.* When *bilious headach* seems to depend upon the congestion or accumulation of bile in the biliary passages, then chologogues, particularly calomel or blue pill, should be given, and followed, after a few hours, by a stomachic purgative, which should be repeated until a full effect is produced. In these cases, it will often be necessary to repeat the mercurial, as well as the purgative, oftener than once; the infusion of senna, or equal parts of it and of a tonic infusion, being given with an alkaline subcarbonate, or with a neutral salt and the extract of taraxacum, or the supertartrate of potash in large doses, with the confection of senna, and this extract. When the headach seems to proceed from an exuberance of acrid bile, then demulcents with cooling aperients, or with alkaline carbonates, saline medicines in a state of effervescence, and warm mucilaginous diluents, are generally useful. In cases of this kind, it is necessary to dilute the acrid secretions, to evacuate them from the bowels, and to protect the digestive mucous surface from their irritating operation. When the acridity of the bile is the consequence merely of its retention and accumulation in the biliary apparatus, then these means will be sufficient to remove disorder; but when it depends upon the exuberance in the blood of the elements whence bile is formed, or upon a morbid action in the liver, a vegetable or farinaceous diet, bland fluids, the alkaline carbonates and refrigerants in camphor mixture, regular exercise, especially of the muscles of the upper extremities and of the trunk, are then required. If the action of the liver is not improved by these means, recourse should be had to mercurial alteratives or aperients; and, if it be connected with vascular excitement of, or determination to, the organ, local depletions, antimonial preparations, diaphoretics and diuretics, external derivatives, and the antiphlogistic regimen, should be prescribed. In every case, fæcal accumulations and morbid secretions should be regularly evacuated by the means already advised.

48. *D. Organic* or *Cerebral Headach.* — When the patient complains of increased pain in the head on moving it, of spasms or pains in the limbs, or of impaired sensibility or motion of them, of sickness, and of any of the characteristic symptoms of this variety (§ 25.), depletions, general or local, according to the peculiarities of the case; deobstruent purgatives; internal and external derivatives, blisters applied on the nape or behind the ears and kept long discharging, setons or issues, low diet, mental and bodily repose, and local or general refrigerants, or diaphoretics, as circumstances indicate, then constitute the principal means of affording relief. After these have removed vascular excitement, small doses of the bichloride of mercury, or of the iodide of mercury, or of the hydriodate of potash, or of the ioduretted hydriodate of potash, or of the arsenical solution, may be prescribed, and continued until the effects are ascertained. But external derivation should be also persisted in. (See also arts. Brain, § 211. 222., and Palsy.)

49. *E. Pericranial Headach.* — When the affection proceeds from disease of the pericranium or of the cranial bones (§ 26.), the treatment is essentially the same as that just advised (§ 48.); but it may be modified to meet various peculiarities and changes. If the affection is syphilitic, the bichloride of mercury, or the iodide of mercury, or the other preparations of iodine above mentioned, may be employed. If the periosteum, or the bone, be diseased, an incision should be made down to the affected part, and a free discharge afterwards maintained, as successfully

practised by Mr. Pearson and Sir B. C. Brodie. If this affection have proceeded from inflammation of the ear, the discharge from the external meatus of the organ should be allowed a free egress. (See Ear — *Inflammation of*, § 26—29.)

50. *F. Rheumatic* and *Arthritic Headachs* should be treated with strict reference to the diathesis or constitutional disorder. — *a*. If *rheumatic headach* is not associated with inflammatory action of the membranes, the head should be kept warm, and the secretions and excretions freely promoted and evacuated. After biliary and fæcal accumulations have been carried off, camphor, ammonia, and colchicum, may be given in conjunction; or one or more of these may be taken with bark or any other tonic; or with magnesia, or with the subcarbonate of soda or potash, especially when the urine deposits a copious sediment, or is acid. If severe symptomatic fever, or signs of inflammatory action in the cerebral membranes, accompany the rheumatic affection of the head, local depletions, antimonials, active cathartics, and derivatives, should be prescribed, and colchicum freely exhibited. But, when these symptoms are absent, either of the following medicines will generally give relief; a full dose of calomel, or of blue pill with James's powder, or some antimonial, having been taken at bed-time, and a stomachic purgative the following morning, and repeated according to circumstances: —

No. 250. ℞ Camphoræ rasæ, Quininæ Sulphatis, Pulveris Radicis Colchici, āā gr. xviij.; Extracti Hyoscyami ʒ ss.; Conserv. Rosar. q. s. M. Fiant Pilulæ xxiv., quarum capiat duas, bis terve in die. — vel

No. 251. ℞ Sodæ Sub-carbon. ℈ j.; Tinct. Colchici Comp. ʒ ss.; Tinct. Cardamom. Co. ʒ j.; Decocti Cinchonæ (vel Infusi Cascarillæ) ℥ x.; Spiritus Lavandul. Comp. ♏ xij. M. Fiat Haustus, ter in die sumendus.

51. *b. Arthritic headach* sometimes requires local depletions, from the nape of the neck and from behind the ears, especially in plethoric or robust persons; but a too great quantity of blood should not be taken away. The lower extremities ought to be put in warm water, containing flour of mustard and salt; and if the headach is not very much relieved by these means, mustard poultices may be applied to the feet. *Colchicum* should also be prescribed, with aperient or purgative medicines, and with magnesia, or the alkaline carbonates, as recommended in the article Gout (§ 55. 82. *et seq.*). In these cases, the colchicum, when given in small or suitable doses, and continued for some time, in order to insure its action on the liver and on the kidneys, seems to favour the elimination of the superabundant urea from the blood; a great excess of this substance in the circulation being generally connected with the production of the gouty affection, in all its modes of manifestation. As urea is the sum or ultimate product of assimilation, or results from a combination of the effœte elements of human organisation; and as it is liable to accumulate in the blood when the functions of excretion are impaired, owing to weakened organic nervous power (see art. Gout, § 40—42.); so it is not improbable, that, when it is thus superabundant, it becomes an excitant not only of morbid or altered sensibility, but also of increased vascular action, and of local determination, — that, in short, it is the *materies morbi* of the ancients, and one of the forms which effœte and excrementitious elements in the blood assume; and that it constitutes a part of the morbid condition, of which I have shown gout to be the chief manifestation. This view is supported by the experiments of Prout, Chelius, and others, showing the superabundance of urea, and its combinations in the urine, when the actions of the kidneys are freely exerted, towards the decline of the gouty attack.

52. *H*. It is unnecessary to enter into the treatment of the other *symptomatic varieties of headach*, inasmuch as the means of cure for them are essentially the same as are fully stated in the articles on those diseases, of which headach is a frequent symptom. — *a*. When the pain is *intermittent*, independent of organic lesion, and one of the forms which *masked ague* assumes, then a full dose of calomel, with James's powder, or of any other mercurial alterative, at bed-time, a brisk cathartic draught early the following morning, and, after the operation of these, the sulphate of quinine with camphor, or the preparations of bark and serpentaria, will remove the affection. — *b*. If the headach be *hysterical*, the means already advised for *nervous headach* (§ 40.) will generally remedy it. If, however, the pain be symptomatic of disorder of the uterine, or of the urinary, functions, the means of cure must be directed to the restoration of these functions to the healthy state, as shown in the articles on Menstruation, Urine, and Uterus; and to the removal of vascular plethora, by evacuations and derivatives, especially when the affection depends upon this state of the circulation, or arises from suppressed or diminished secretion or excretion. (See *Treatment of Plethoric* Headach, § 45.) — *c*. The headach attending *hypochondriacal affections* is frequently relieved by the means advised for dyspeptic and bilious headachs (§ 46.); but the treatment may be conducted in all respects as directed in the article on Hypochondriasis. — *d*. *Local* or *neuralgic headachs* (§ 35.) require the removal of the cause of irritation, when it can be accomplished, and generally the means already advised for the nervous and congestive varieties (§ 40—44.), — sometimes a constant and energetic action to be exerted upon the intestinal canal, — frequently the exhibition of tonics, stimulants, and narcotics, or anodynes, — occasionally external irritants, or vesicatories, as moxas, croton oil applied to the surface, the tartar emetic ointment, issues, blisters, &c., — in some instances, the application of narcotics, as veratria, &c., to the part affected, or of the acetate of morphia to the skin denuded of its cuticle, and the other means mentioned in the article on Neuralgic Affections.

53. xv. Brief account of Remedies recommended by Authors. — *A*. *Evacuants*. — *a*. *Emetics* have been advised for headachs by Cælius Aurelianus, Horstius, Ruland, Riedlin, and Frank; and are often of great benefit when the pain proceeds from injurious ingesta, from the accumulation of bile in the biliary passages, or from impeded circulation in the vena porta. — *b*. *Purgatives* are not less useful; and have been very generally, but often empirically, prescribed for headachs. Selig trusted chiefly to them for the removal of the intermittent form of the affection. Considerable judgment is, however, requisite in the selection of medicines of this class, and in the combination of them with other substances, so as to secure all

the advantages they are calculated to afford. Aretæus, and many others of the ancients, employed *hellebore*. When the pain arises from accumulations of bile, or from obstructions to the excretion of this fluid, then *calomel*, conjoined with some other purgative, and occasionally also with antimony, or with ipecacuanha, is most appropriate. In the nervous, the congestive, the dyspeptic, the periodic, and in the hypochondriacal forms of headach, the stomachic purgatives prescribed above (§ 46.), or the combination of a purgative with a tonic, carminative, or aromatic, &c. (F. 215. 266. 379.), will be found most serviceable. — *c*. *Vascular depletions* are requisite in plethoric and inflammatory headachs. *Bleeding* from the arm, sometimes from a vein in the foot, or *cupping* on the nape, are the most eligible modes. Aretæus, Cælius Aurelianus, and Velschius, preferred cupping on the head itself. I have repeatedly directed it to be performed on the occiput, behind the ears, or on the temples; and, when a small quantity of blood is to be taken away, these are often preferable situations. *Leeches* may be applied in circumstances similar to those requiring cupping. *Arteriotomy* has received the sanction of Aretæus, Schenck, Wepfer, Willis, Zacutus Lusitanus, and of many recent writers; but I believe that it possesses no advantages above the other modes of vascular depletion, even in the most inflammatory form of the complaint. — *d*. *Sudorifics* are most beneficial in the febrile, inflammatory, rheumatic, and periodic states of the affection. In the last of these, they have been prescribed by Morgagni. The selection of sudorifics or diaphoretics should be guided by the state of the general circulation, and of vascular action in the head. When either the former or the latter is excited, *tartarised antimony*, in frequent doses, or *James's powder*, and the more refrigerant diaphoretics, are most appropriate; but when the head is cool, and the pain is connected with rheumatism, depression of vital power, and suppressed cutaneous function, the *warm*, or *vapour bath*, *camphor*, the *mistura guaiaci*, or weak infusions of *serpentaria*, or of *arnica*, or of *briony*, will be more beneficial than antimonials, unless these latter be conjoined with opiates and restoratives.

54. *B*. *Stimulants and Antispasmodics*.—These are serviceable chiefly in the nervous, the rheumatic, the hypochondriacal, and the neuralgic forms of headach, and sometimes in the intermittent, the congestive, the dyspeptic, and hysterical.—The medicines of this kind most commonly prescribed are, the preparations of *camphor* and *ammonia*, the *succinated* and *fœtid spirits of ammonia*, the *æthers*, *castor*, *musk*, *serpentaria*, *spirits of lavender*, &c.—Besides these, preparations of *arnica* have been recommended by Selig, Dumangin, and J. Frank; *cajeput oil**, by Thunberg; a strong infusion of *coffee*, by Baglivi and Percival; an infusion of *verbena*, *betonica officinalis*, and *semina coriandri*, by J. Frank; and the *ledum palustre* by Linnæus. *Valerian* has been praised by Strandberg and Fordyce. I have found the infusion, with the ammoniated tincture, of valerian, or the fœtid spirit of ammonia, of great benefit in the headachs just mentioned. *Black pepper* has been recommended by Lange in the dyspeptic variety; and its active principle, *piperine*, has been employed in the intermittent form of the affection. *Guaiacum* has been prescribed by J. Frank in rheumatic and arthritic headachs. It is of service in combination with colchicum and magnesia, or with an alkali. *Green tea* and *coffee* are very commonly resorted to in the above forms of headach, as domestic remedies.

55. *C*. *Tonics*. — *a*. The preparations of *bark* are generally beneficial in the periodic and non-inflammatory kinds of this complaint. The *sulphate of quinine* is now generally preferred; but, in many cases, the decoction of cinchona, with the compound tincture, and an alkaline subcarbonate, will be more efficacious. — *b*. *Absinthium* was most frequently employed by the older writers. Riverius conjoined it, or other bitters, with purgatives; a practice deserving of more general adoption. — *c*. The *cascarilla bark* was used, for nervous and dyspeptic headachs, by Riedlin; and is excelled only by cinchona. — *d*. The *muriate of ammonia* is also of service in the nervous and intermittent varieties. — *e*. The *arsenical solution* was praised by Darwin. I have prescribed it, and taken it myself, for headach, with marked benefit. — *f*. The *muriate of baryta* was recommended by Hufeland, for the pains proceeding from, or connected with, scrofulous disease. — *g*. The preparations of *iodine* are, however, more deserving of adoption, when the complaint is thus associated, and when it depends upon organic lesion. They may be given with any of the narcotics about to be mentioned. I have lately proved their efficacy in the rheumatic variety of headach, arising from the gonorrhœal infection. The *hydriodate of potash* is preferable in this latter form; and, indeed, in several others. — *h*. The extract of *nux vomica* is mentioned by Horn, and may be given in small doses, as a tonic, in the nervous, the rheumatic, and the hypochondriacal varieties; but its effects must be carefully watched. It is preferable to the active principle, *strychnine*, which should be prescribed only in very minute doses.

56. *D*. *Narcotics* and *Anodynes* have been employed in several of the varieties of headach, both externally and internally. — *a*. *Opium*, in various forms, has been directed by Whytt, Mursinna, J. Frank, W. Stokes, and many others; especially in the nervous, the rheumatic, and intermittent kinds of the complaint. The *acetate* and *muriate of morphia* are now generally used; but they, as well as other preparations of opium, should be conjoined with camphor, or with an aromatic, in order to insure their good effects. — *b*. *Aconitum*, in the form principally of extract, was praised by Stoerck and Vogel; and was once much employed in rheumatic and chronic headachs. It is certainly often beneficial in these, as well as in the nervous varieties; but it should be given in small doses, and its effects carefully observed. *Aconitine*, the active principle, is to be preferred as an external application, in the neuralgic or rheumatic states of the complaint; but even in these it requires the utmost caution. The powder of the root, or of the leaves, may sometimes be ordered with advantage. I was lately consulted in a case where the incautious employment of aconitine caused an apoplec-

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* Humberg prescribed the cajeput oil externally; but I have ordered it to be taken internally, and with great benefit.

tic seizure, and hemiplegia. — *c. Belladonna* has been used in somewhat similar cases to those for which the aconitum has been exhibited. The extract, or the powder of the root or of the leaves, may be given, either alone, or with camphor, or an aromatic. I prescribed it in a case of hypochondriacal headach, with much benefit. — *d. Hyoscyamus* has likewise been recommended by Stoerck, Renard, and others. I have found it of great use when combined as just stated, or when conjoined with ipecacuanha and some stimulating antispasmodic, and given in a decided dose. — *e. Conium* was directed by Lettsom; the distilled *laurel-water*, by J. Frank; and the *prussic acid*, by Good. *Digitalis* is considered by Frank as very beneficial in the headach proceeding from scrofulous disease. — *f. Stramonium* has been prescribed by several writers. I have seen it given with benefit.

57. *E. Alteratives* are required whenever the affection of the head appears to depend upon a morbid state of the secretions, upon impaired action of the chief excreting viscera, or upon an impure state of the circulating fluids. — *a.* Of these, *mercurials* are the most active, and most generally used, both internally and externally, for this complaint. *Calomel* was prescribed largely by Wepfer, Velschius, Bang, &c. It is most serviceable when the headach depends upon accumulations or obstructions of the bile, and a torpid state of the bowels, and when conjoined with, or followed by, other purgatives. In the rheumatic form it is advantageously conjoined with antimony and opium. The *blue pill* may be prescribed on similar occasions, and in the same manner. The *bichloride of mercury* was preferred by Lentin, De Moneta, Van Swieten, and Gmelin, especially in the headachs depending upon organic lesions within the cranium, or upon disease of the bones. In these, as well as in some other cases, it may be prescribed in a tonic tincture or decoction. The *iodide of mercury* may be used in similar circumstances. Mercurials were pushed to *salivation* by Willis, Lentin, Nück, Bang, Darwin, and Blane; but this effect is rarely required unless when the pain resists all other means, or proceeds from a syphilitic taint. — *b. Alkalies*, particularly the subcarbonates of soda or of potash (Thilenius), the solution of potash, or Brandish's alkaline solution, are often of service, when given in tonic or aperient infusions or mixtures, and aided by the decoction or extract of *taraxacum*. — *c.* An infusion of two or three drachms of the *clematis vitalba*, in a pint of boiling water, was recommended by Stoerck and Muller, to be taken in the twenty-four hours. — *d.* The decoctions of *sarsaparilla* are more deserving of adoption, and may be made the vehicles for the exhibition of other medicines which produce an alterative effect, as the bichloride of mercury, the hydriodate of potash, the alkalies, the extract of taraxacum, &c. — *e.* The *alkaline chlorides* may be also tried. — *f.* The precipitated *sulphur* will be found beneficial in the rheumatic form of the complaint, if taken daily in sufficient quantity to exert a gentle action on the bowels. — *g.* The preparations of *colchicum*, when given in small doses, and conjoined with magnesia, or with sarsaparilla and the alkalies, also exert an alterative operation, as explained above (§ 52.); and are of great use in the arthritic and rheumatic forms of the affection. — *h.* Various *mineral springs* are extremely serviceable; but they require to be appropriately prescribed. Those containing iron, fixed air, lime, or the alkaline carbonates, are most suited to the nervous, neuralgic, rheumatic, and dyspeptic varieties; those holding sulphur, &c., in the rheumatic, arthritic, bilious, hypochondriacal, &c.; and those containing the purgative salts, in the bilious, arthritic, hypochondriacal, &c.

58. *F. Derivatives* — whether those which exert an immediate and brief effect, or those which act more slowly but permanently — are of great benefit in several forms of headach. — *a.* To the former class, *purgatives* may be said to belong; as they not only increase secretion and excretion, but also determine the fluids to the digestive canal. — *b. Masticatories* were employed for headachs by Celsus, Aretæus, Forestus, Muralt, and many others; but they have now fallen into disuse. Nevertheless, they are frequently of service. — *c.* The same remark applies to *sternutatories*, which have been recommended by the same writers, and have experienced the same fate. The benefit derived from various *cephalic snuffs* is undoubted, even in cases that have resisted other means; and has led to their adoption as empirical remedies, in irregular and domestic practice. They are beneficial in exciting the olfactory nerves, and thereby the cerebral functions, and in procuring a defluxion from the Schneiderian membrane. — *d. Warm pediluvia* and *manuluvia* are often resorted to, especially when the extremities are cold, or when the pain depends upon determination of blood to the head. In these circumstances, the addition of mustard and of salt to the water will be of service. — *e. Sinapisms*, and *stinging* with nettles, or *urtications*, were employed by the ancients in the treatment of headach. Celsus, Aretæus, and others, directed sinapisms to the head, over the seat of pain; but Themison contended for their application to the lower extremities. — *f. Blisters* on the nape, sometimes on the extremities, are now more generally prescribed. — *g. Setons* and *issues*, in these situations, or in the arm, are commonly recommended in the more obstinate cases of the complaint; and when the pain is suspected to arise from organic lesion. They are praised by Riverius, Zacutus Lusitanus, Holler, Fabricius Hildanus, Heister, Purmann, and De Haen. I have prescribed them in several cases with benefit. — *h.* The *tartarised antimonial ointment* has also been of advantage when applied on the nape of the neck, and its effects on the integuments fully procured.

59. *G. Topical Means.* — *a.* The application of *cold* to the head or temples, in various modes, has been advised by most writers, when the pain proceeds from determination of blood to, or inflammatory action of, the brain or membranes. A recourse to the *affusion* of cold or tepid water on the head; and the repetition of either, according to the grade of vascular action in it, are often preferable to the continued application of great cold, which is sometimes productive of mischief. Cold sponging, cold lotions, or epithems, wetting the forehead and temples with æther, or with aromatic waters, &c., and the shower bath, are severally of benefit, especially in the plethoric or inflammatory states of the affection; but the *douche*, or

affusion, should be preferred in the congestive form, especially when caused by narcotics. — *b. Warm applications* and *warm coverings* on the head have been sanctioned by Celsus, Lange, and many others. In nervous and rheumatic headachs especially, they are frequently of great service. Alexander Trallianus prescribed them in the form of emollient fomentations. Diemerbroeck and Marcus directed fomentations with aromatic herbs; and J. Frank warm epithems, moistened with a decoction of *verbena* and *betonica officinalis.* Hot *sinapisms* applied over the affected part have been resorted to by some of the ancients (§ 58.). — *c. Blisters* on the head are occasionally of service, especially in the congestive and rheumatic varieties of headach; but they require much discrimination. They have been applied to the scalp by Riverius, Schrader, Bang, Pouteau, Aubert, Monro, and others; but, unless in some cases of the varieties just stated, they are more useful behind the ears, where they may be kept open for some time, or often repeated. — *d. Stimulating liniments* (F. 299. 311.), rubbed assiduously on the scalp, are sometimes of service, when cautiously prescribed, in nervous, rheumatic, and neuralgic headachs, or hemicrania. Liniments, also, containing *acetate of morphia,* or the extract of *belladonna,* or of *aconitum,* or of *hyoscyamus,* or of *stramonium,* or of *opium,* have been advised, by several writers, to be rubbed upon the scalp, in obstinate cases of this kind. I have found them of service in several instances, although it was doubtful whether they, or a full dose of acetate of morphia, given with aromatic spirits, that was also prescribed in some of the cases, had produced the effect. Very recently, ointments, containing *veratria, aconitine,* or other acro-narcotic substances, have been directed to be similarly applied in these affections. I have seen benefit derived from them in two or three instances; but I have known others where they either failed in giving relief, or seemed to be injurious. The propriety of having recourse to them is often doubtful. — *e.* The tartarised *antimonial ointment* may be used in the varieties of headach just mentioned, or even where organic lesion within the cranium is suspected; but the effects of it, as well as of liniments, ought to be carefully watched. — *f. Frictions* of the scalp have been advised by Gilbert and others, and have been of advantage when regularly and assiduously practised. — *g. Compression* of the carotids, although suggested by Serapion and Parry, is undeserving of further notice. The same remark is applicable to strait *cinctures* of the head, advised by some writers. — *h.* The *actual cautery,* applied to the seat of pain, has been recommended by Hippocrates, Celsus, Aretæus, Velschius, Aulagnier, Valentin, and by other ancient and modern writers. It is, however, reprobated by Cælius Aurelianus, and is now rarely had recourse to. — *i.* The application of *moxas* — a modification of this practice — has been long adopted in Eastern countries; and has been advised by Pascal, Saissy, Larrey, J. Frank, and others. Wepfer advises the moxas to be placed in the course of the coronal suture; Pouteau, on the vertex; and Velschius, on the temples. — *k. Incisions* of the scalp, in the seat of pain, have been directed by Le Bruyn, Severinus, Grateloup, Tissot, and Sumeire. They are more serviceable in disease of the pericranium, or of the bones of the cranium. *Issues* in the scalp have been sanctioned by Purmann and many others. I have seen benefit accrue from them in two instances. — *l. Electricity* and *galvanism* have been recommended by many in headachs; but they produce merely a temporary benefit, and are not always safe. — *m. Trephining* the cranium has been favourably noticed by Baglivi, Morgagni, Meekren, Marchetti, Vogel, Schmucker, and Good, and actually practised by some of them. It is only when the pain is very violent, confined to a single spot, has followed an external injury, and resists all other means, that the practice can be entertained. Mr. S. Cooper states, that he has seen two cases, in which the patients lost their lives by this treatment. — *n.* The *extraction of carious teeth* should not be neglected in hemicrania, or local pain of the head from this cause. In a case where this object could not be accomplished, and in another where it was objected to, I directed a strong solution of the acetate of morphia, to which aromatic spirits were largely added, to be rubbed upon the seat of pain; and complete relief was obtained. The application of *créosote* to the tooth, or of camphor, acetate of morphia, and capsicum conjoined, has also been of service.

60. In the sketch here given, I have mentioned only such means as seem deserving of a trial, or are calculated to be of service in some one or other of the numerous forms and circumstances in which headach is presented to the practitioner. I have furnished suggestions merely; but these will be useful even to the most experienced. The advantage to be derived from them will entirely depend upon the pathological acumen by which their application to particular cases may be guided.

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HEARING — Impaired or Lost.

Classif. — 4. *Class*, 1. *Order* (*Cullen*). 4. *Class*, 2. *Order* (*Good*). IV. Class, III. Order (*Author*).

1. Those diseases of the organ of hearing which are not necessarily attended by impaired function, were considered under the article Ear. At this place, therefore, diminution, or loss of hearing — *Deafness* — will be considered with reference to the lesions which usually occasion it, and to appropriate treatment. The disorders of hearing may be divided into — 1st, *Exaltation of this sense*; — 2d, *Depravation of hearing*; — 3d, *Impaired or lost hearing*. — The *first* of these is merely symptomatic, and is observed chiefly in affection of the brain, and in fevers (see art. Symptomatology); the *second* is fully considered at another place (see art. Ear, § 2.); the *third* only remains for discussion.

2. Before entering upon the consideration of the various lesions causing deafness, directions as to the best mode of inspecting the ear are required, as, unless the auditory passage be carefully examined, the diagnosis of affections of the ear must necessarily be very defective. — In consequence of the curvature of this passage, the bottom of it and the membrana tympani cannot be distinctly seen, unless the patient's head be very much inclined to the opposite side, the ear directed to the sun, or a strong light reflected into it, and the auricle drawn well upwards and outwards, whilst the tragus is pressed outwards. The rays of light may thus be made to fall upon the bottom of the meatus, provided that the external ear be sound. But when it is the seat of morbid changes, a *speculum* is requisite in order to convert the curvature of the passage into a straight line. This instrument should be nearly round, and funnel-shaped, the inside of the arms being blackened, or rendered dim. When the ear is examined with the aid of the speculum, the light of the sun, as recommended by Dr. Kramer, should be preferred; but the light reflected from a small mirror may be employed.*

3. I. Deafness from Affections of the External Ear. — i. *Diseases of the Auricle*, especially erysipelatous inflammation extending to it, and boils, may impair the function of hearing, but never in a remarkable manner, nor permanently, unless the inflammation has extended to more internal parts; a circumstance which occasionally takes place. Dr. Kramer notices the occurrence of scirrhus of the auricle, as a cause of deafness; but it is very rarely seen.

4. ii. *Diseases of the Auditory Passage and Membrane of the Tympanum.* — All affections of these parts are either inflammatory, or the consequence of inflammation in some one grade or other, affecting one or more of the tissues in this situation. The fact is ably supported by Dr. Kramer, who remarks, that the different forms of disease seated in the auditory passage depend upon inflammation of the constituent structures, and they are characteristically defined, as one or other structure is affected. — The effects, therefore, of these inflammations can hardly be considered separate states of disease, unless they continue after the inflammation which caused them has disappeared.

5. A. *Erythematic inflammation of the auditory passage* generally causes accumulations of brownish hard wax, obstructing more or less the

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* Writers on the diseases of the ear, with few exceptions, advise various instruments, each finding fault with those proposed by others; each lauding his own practice, and each detracting from the merits (such as they are) of his contemporaries. In this, however, the despised aurists do not stand alone; for all those who take a single organ under their especial protection — and what organ has not been thus distinguished? — belong to the same category, as they are most anxious entirely to appropriate the object of their adoption, and evince the utmost rancour to those who attempt to encroach on their province. Verily, of all empirics, the regular in respect of qualification is the most uncompromising, and the most degrading to medical science and the character of the profession.

function of the organ. It sometimes occurs in persons of a cachectic habit of body, or in conjunction with chronic affections of the skin, and in connection with disorder of the digestive and excreting organs. It is often excited by substances that have passed into the ear, or by neglect of cleanliness, which, however, is not so frequent a cause as is generally supposed; the accumulation of hardened or morbid wax, with increased sensibility, pain, or soreness in the meatus, being the chief indications of the affection. In its slighter states, itching or formication in the passage is only felt.

6. The *Treatment* of deafness from this cause consists chiefly of syringing the meatus with tepid water, and of attending to the digestive and excreting functions, and to the general health. Mr. BUCHANAN recommends a small syringe with a slender point to be employed, fearing that the *membrana tympani* may be ruptured by the quantity of fluid injected, and by obstruction to the counter-current by the point of the instrument being too thick. Dr. KRAMER, however, considers that this precaution is unnecessary, as the membrane cannot be injured by the stream of water, and as the loosened wax will readily flow out with the water. He therefore uses a syringe that will contain an ounce and a half of water, the pipe being three quarters of an inch long, and the opening wide enough for a strong stream.

7. *B. Deafness from inflammation of the follicles of the auditory passage*, seldom is considerable, until the inflammatory action has given rise to some lesion of structure.— *Mucous or catarrhal otorrhœa* (see art. EAR, § 18.) is caused by the affection of these glands. From this inflammation, and from that of the *membrana tympani*, various excrescences or morbid growths in the meatus ultimately proceed. On inspection, redness and partial swelling of the walls of the passage are first observed; and, if the affection continues long, or becomes chronic, excrescences, or polypi, of a soft, spongy, or vesicular appearance, are gradually formed. These are red, sensitive, roundish, pedunculated, and readily bleed when irritated. In some cases, they have a broad hard base, are insensible, and not disposed to bleed. These obstruct more or less the meatus, and impede the functions of the organ. Hardened mucus and wax may also accumulate in the passage, as a consequence of the chronic states of this affection, and of the obstruction caused by these excrescences.

8. The *Treatment* of this disease should be directed according to the method just advised (§ 6.). The extirpation of the fungous growth should be performed; but, as M. ITARD has stated, the deafness may continue nevertheless; for the membrane of the drum may be thickened, or ulcerated, or covered by inspissated secretions; and otorrhœa will often long remain. In these cases, injections of tepid water, or of emollient and diluent fluids; blisters on the nape, and kept open, or setons or issues; and the means advised for the removal of *mucous otorrhœa* (see art. EAR, § 29.) should be prescribed.

9. *C. Deafness caused by phlegmonous inflammation of the cellular tissue* of the passage, rarely occurs: but this affection may be mistaken for the preceding; from which, however, it is readily distinguished by its rapid course, and termination in abscess, — results never observed in inflammation of the follicles. Owing to the severity of the pain, and other symptoms, it may be confounded with inflammation of the internal ear; but, in this case, the external passage never presents any lesion on inspection, at least at the commencement. — This disease is usually *caused* by cold or currents of air.—The *treatment* is altogether the same as recommended for *external acute Otitis* (see EAR, § 27.).

10. *D. Inflammation of the periosteum of the passage*, is most common in children of a scrofulous diathesis, and generally occasions caries of the bony structure, which is readily detected with the probe. If exfoliation of the diseased bone occur, and the ulcerated part begins to heal, narrowing or obliteration of the meatus may take place. In these cases, the deafness often depends as much upon congestion of the adjoining parts, as upon swelling and disease of the passage.—Dr. KRAMER advises, in the *treatment*, that, when the parts show a tendency to close, they should be opened up by art, and maintained open by touching them with lunar caustic, throughout their extent. Hearing, however, usually continues very dull, owing to the natural form of the meatus having been lost, and to the membrane of the drum having become thickened.

11. *E. Deafness from disease of the membrane of the drum.*—It has been supposed, that relaxation of this membrane, that too great tension of it, that rupture of it, and that rupture of the tendon of the *tensor tympani*, may severally occasion impaired hearing. CLELAND, SAISSY, BECK, and others, think that these lesions may be produced by violent sneezing, by claps of thunder, by noises of artillery, &c.; but, as KRAMER contends, these suppositions are unfounded; rupture of these parts never occurring unless from inflammation and its consequences. He remarks, that perforation of the membrane is in rare cases met with, little or no mucous or purulent discharge having been observed; but, even in these, upon examination, in a bright sunshine, with the speculum, a viscid, mucous, or puriform matter is always found at the bottom, and the remaining portion of the membrane is seen, reddened, thickened, and opaque.

12. *a. Inflammation of the membrane of the tympanum* most frequently occurs in connection with inflammation of one or other of the structures of the meatus, especially of the follicles. It may, however, take place primarily, and constitute the chief affection. Acute inflammation of this part is not so common as the sub-acute and chronic states; and either, when neglected, gives rise to opacity, thickening, perforation, purulent discharge, fungous or polypous excrescences, &c.; but the chronic states most frequently induce these lesions. In acute inflammation, the membrane is seen, on careful examination, more or less red, rough, swollen, and opaque. It often seems as if covered with small projecting glands or follicles. Sometimes bundles of vessels are seen in it, and the point of insertion of the handle of the malleus cannot be distinguished, Dr. KRAMER states, that inflammation of this part are distinguished from internal inflammations of the ear, not only by the greater mildness of the former, but especially by the changes of

the membrane presented by them from the commencement; whereas, in the latter, such changes cannot be detected early in the disease, however violent the symptoms and attendant fever may be; and occur only in the further course of the malady, when the membrane is about to burst from the pressure of accumulated matter, or has become involved in the inflammatory process. The different grades of this disease have been imputed to *nervous otalgia*, or confounded with it. Dr. Kramer, however, denies the existence of such an affection. In this he is evidently mistaken (see Ear, § 6.); although it must be admitted, that both this, and other inflammatory diseases of the ear, are often improperly viewed as nervous merely. The hardened secretion in the meatus, to which the more chronic states of inflammation of the membrane have been imputed, is more commonly the result of inflammatory action, than its cause. The disease, in both its primary and its consecutive states, generally impairs hearing more or less.

13. The *Treatment* is the same in this as in the other inflammatory diseases of the meatus; and as directed for *inflammations of the external* Ear (§ 27. 29.). — Dr. Kramer, however, prefers injections containing the acetate of lead; and pours a solution, varying in strength, from one grain to ten of the salt to an ounce of water, into the diseased ear, twice or thrice a day. Injections of a solution of the nitrate of silver, or of the sulphate of zinc, or of alum, have been also recommended; but unless they be weak, they often occasion pain and irritation in the meatus. A few drops of pyroligneous acid, to an ounce of water, have likewise been used as an injection. Both it, and the superacetate of lead, will effectually remove the offensive odour of the discharge.

14. *b. Deafness from perforation of the membrane of the drum.* — Kramer states "that many authors, and among them even Itard, are of opinion that perforation of this membrane does not necessarily weaken the hearing." Now this not altogether just: for M. Itard contends, that, when the opening is small, the hearing in some cases is not materially impaired; although in the great majority it is more or less so; but that, when it is considerable, or when a large portion of the membrane is destroyed or detached, hearing is always very much injured. Although perforation of the membrane causes deafness, yet there are states of the ear, and even of the membrane itself, in which *artificial perforation* of it may be attended by some benefit. Such states are, however, few; and the instances of success from the operation have been rare or equivocal.

15. *Artificial perforation* of the membrane was first performed by Sir A. Cooper, many years since; but the circumstances requiring the operation were not fully understood, until explained by Deleau and Kramer. The latter of these writers remarks, that Sir A. Cooper supposed perforation of the membrane to be indicated chiefly in cases of obstruction of the Eustachian tube, and in extravasation of blood in the cavity of the tympanum; but, as he appears to have been unacquainted with catheterism of this tube, his diagnosis of the closure of it was altogether uncertain. Even supposing these morbid states actually to exist, they may be treated more efficiently by introducing the catheter into the tube itself, than by perforating the membrane. Itard contends, that the operation is admissible only when there is invincible obstruction in the tube; Saissy advises it only in thickening and hardening of the membrane; and Deleau recommends it also in this case, as well as in obstruction or obliteration of the Eustachian tube, and in obstruction of the cavity of the tympanum. Dr. Kramer has recourse to the operation only when the *membrana tympani* is much thickened, quite insensible to the probe, hard as cartilage, and if the hearing is very impaired; but, even in this case, it should be performed only when both ears are affected with considerable deafness, and when the ear to be operated upon does not suffer from any other disease, by which the result might be rendered abortive.

16. II. Deafness from Disease of the Eustachian Tube and Cavity of the Tympanum. — i. *Affections of the Tube.* — The Eustachian tube may be obstructed — 1st, By the pressure of tumours in its vicinity; — 2d, By inflammation causing tumefaction of the mucous membrane, effusion, &c.; — and, 3d, By the more remote consequences of inflammation, namely, constriction or obliteration of a portion, or of the whole, of the canal. — Before, however, any of these can be accurately ascertained, it is necessary to have recourse to means of exploration similar to those employed in obstructions of some other canals. The introduction of tubes or catheters into the canal, in order to ascertain the nature of, and to remedy, various affections both of it, and of the cavity of the tympanum, has been resorted to by Sabatier, Wathen, Douglas, Saissy, Itard, and others. Through this tube, lukewarm water was sometimes injected by these writers, in order to judge of the state of the middle ear, according to the sensations produced by it, or by the total absence of sensation. Deleau and Kramer, however, rejected the use of water as an injection; and adopted the suggestion of Cleland, to employ air instead of water, in the investigation and treatment of diseases of the tube and cavity of the tympanum. Dr. Kramer recommends the usual silver inflexible catheters to be used; and air, compressed in an apparatus he describes, to be injected through it in the following manner: — "After the catheter has been introduced into the tube, and fixed by means of a frontlet, the patient is placed close to a table, on which he leans his elbow, holding with the hand of that side the pipe of the air-press filled with compressed air. The operator then introduces the metal beak of the pipe into the funnel-shaped dilatation of the catheter, applies his ear close to that which is being examined, opens the cock of the machine and listens to the sound, caused by the air rushing into the cavity of the drum. When the tube and cavity are free, the air strikes with an audible shock against the membrane of the tympanum. When the shock is over, or is slight, a blowing or rustling in the ear of the patient is heard, caused by the streaming of the air." All variations from this sound are morbid, and furnish more or less distinct indications of diseased changes in the organ. If the air-douche does not penetrate to the *membrana tympani*, Dr. Kramer advises catgut bougies to be used for opening the passage in the tube.

17. *A. Inflammation of the mucous membrane of the Eustachian tube* occasions modified or different results, according to the intensity of the morbid action and the degree in which adjoining parts participate in the disease. — *a. Catarrhal inflammation*, or irritation of the tube, with accumulation of mucus obstructing it, is a not infrequent attendant upon catarrhal complaints, upon inflammations of the throat or fauces, and upon eruptive fevers; the deafness sometimes accompanying these diseases, arising from this affection of the tube. It is most common in moist, cold localities and climates, near the sea coast, and in foggy weather.—The *Treatment* should be directed to the removal of the primary disorder, especially the affection of the throat. If the deafness still continue, astringent gargles containing the subborate of soda, or the nitrate of potash, or the hydrochlorate of ammonia, or gargles with the decoction and tincture of bark and muriatic acid, or the internal use of iodine, may be of service. Aqueous injections into the guttural orifice of the Eustachian tube have been advised by SAISSY, ITARD, and others; but DELEAU and KRAMER prefer the air-douche just described, notwithstanding the good effects of these.

18. *b. Deafness from inflammation of the mucous membrane of the tube* may proceed from disease of the throat, or of the proper membrane of the drum; and be complicated with either, or with both these diseases. In the case of its connection with lesion in the cavity of the tympanum, it is either associated with, or has followed, acute *otitis* or *otorrhœa*. But when the inflammation is confined to the guttural part of the canal, deafness is neither great, nor attended by pain in the interior of the ear. The patient hears well at times, but only momentarily. He hears his own voice even worse than that of others; and occasionally has a crackling, gurgling, or detonating sensation in the throat leading to the ear. The diagnosis is still more to be depended upon, if pain or inflammation exists in the throat or fauces, and if the former be increased on gaping or mastication. The chronic states of this disease of the tube are generally connected with syphilis, or with the scrofulous diathesis.

19. *c.* The *Treatment* of the more acute states of inflammation of the tube should be entirely antiphlogistic. Local vascular depletions; active purgatives, especially calomel with antimony; cooling and detergent gargles, particularly those with the sub-borate of soda, or nitre, or hydrochlorate of ammonia; external derivatives, or the warm or vapour bath, and diaphoretics, are generally required. After vascular depletion, an emetic is sometimes of service; but, as this disease most frequently is consequent upon, or complicated with, an affection of the throat or ear, or occurs in the course of exanthematous fevers, the treatment of it must necessarily depend very much upon the nature and state of the primary or associated malady. When the disease of the tube is chronic, or consequent upon venereal affections of the throat, mercurials, especially the *bichloride of mercury*, gargles containing this substance, or the internal use of the *iodide of mercury*, should be resorted to. In the scrofulous diathesis, the preparations of *iodine* may be tried. In protracted or severe cases, especially when connected with ulceration in the throat, or syphilis or scrofula, treatment is seldom successful, as they have very frequently gone on to the states next to be noticed.

20. *d.* When the inflammation, either from its protracted continuance, or from its extension to the connecting submucous cellular tissue of the tube, gives rise to *thickening of the mucous membrane*, or to *ulceration*, more or less *complete occlusion*, or *stricture*, or even *obliteration of the canal*, may result, especially when an ulcer is seated near the orifice of the tube, and afterwards cicatrises, as in cases of malignant angina, or of venereal ulceration of the throat. It is important to distinguish these lesions from those states of disease which admit of satisfactory treatment. This is to be done chiefly by ascertaining the history of the case: — If the deafness have followed severe affections of the throat, especially that occurring in connection with malignant eruptive diseases, with syphilis, or with scrofula; — if it have continued long, been constant and uninterrupted; — and if it have followed severe *otitis* or purulent *otorrhœa* (see art. EAR, § 10. 18.),—it may be inferred that one or other of the lesions just specified exists. If there be any doubt entertained, recourse to the means of exploration advised by ITARD, namely, by forcing water into the tube; or to that employed by DELEAU and KRAMER, and described above (§ 16.), will establish the diagnosis.

21. Perforation of the membrane of the tympanum has been resorted to by ITARD in cases of this kind; but with very equivocal success. Dr. KRAMER states that he has found them incurable; and that this operation has been of no use in them, as the mucous membrane of the cavity of the tympanum is also diseased. The introduction of catgut bougies into the Eustachian tube has not been productive of any permanent benefit. If obliteration of the canal be complete, the cavity of the drum is always involved in the disease; and, *à fortiori*, perforation of the membrana tympani, advised by some writers, can be of no avail.

22. *e. Deafness may depend upon the occlusion of the Eustachian tube by tumours pressing upon its guttural extremity.* — Enlarged tonsils are the most common cause of this form of deafness; but polypous or fungous excrescences, and enlarged parotids, also, not infrequently produce it. In either case, the diagnosis is very easy, and the indications of cure sufficiently manifest. Polypi must be removed by excision or ligature whenever either can be performed. When the tonsils are enlarged, scarifications, astringent and detergent gargles, stomachic purgatives and tonics, the preparations of iodine, and the other means of cure directed for *enlargement of the* TONSILS (see the article), should be prescribed. If the tonsils contain matter, then puncture or incision of them ought not to be delayed. Enlarged parotids, if the affection be chronic, may be treated with iodine, &c.

23. *B. Inflammation of the cavity of the Tympanum.* — The inflammation may affect only the mucous membrane lining this cavity; or it may extend to the submucous cellular tissue, and even to the periosteum. It is generally either acute or chronic; and, in either case, is a severe and often dangerous disease. The symptoms, consequent lesions, and the treatment of this dis-

ease in its various forms, are fully described in the article Ear (see § 14. *et seq.*). As deafness resulting from *purulent otorrhœa*, with perforation of the membrane of the tympanum, or from *disjunction or loss of the small bones of the ear*, or from *caries of the osseous structure*, belong to the more chronic states of *otitis*, and is discussed in the article just referred to (art. Ear, § 19. *et seq.*, and 28. *et seq.*), it is unnecessary to recur to the subject at this place.

24. C. *Deafness may arise from extravasation of blood in the cavity of the drum.* — This lesion is usually the result of external injury, of violent attacks of sneezing, or of constriction of the neck; but it is chiefly caused by the first of these. In cases of this kind, Sir A. Cooper advised perforation of the membrane; but the extravasated fluid will either pass off by the Eustachian tube, or be absorbed. Moreover, the deafness and other unfavourable symptoms existing in these cases, are not so much dependent upon the extravasation in the cavity of the ear, as upon the injury other parts of the organ, or even the brain and its membranes, may have sustained. When, however, blood is effused in the drum, inflammatory action not infrequently supervenes.

25. III. Deafness from Affections of the Auditory Nerves. — *Nervous Deafness.* — We can seldom arrive at just conclusions respecting deafness from this cause derived from direct phenomena. We can infer it only from the absence of those deviations from the healthy state that have already passed under consideration. When, in connection with the absence of these lesions, ascertained by a minute examination, and by having recourse to the air-douche, there are indications of disease within the cranium, or of some other malady with which the organ of hearing may be presumed to sympathise, then the existence of deafness from an affection of the auditory nerves may be considered as probable. In such cases, there is impaired or lost hearing, without any organic deviation in the ear; the lesion being either in the nerves, in their expansions in the labyrinth, or in their course thither, or in the brain at or near their origins. It is always difficult, frequently impossible, to determine the situation of the lesion; and still more so to ascertain whether the lesion consist of simply impaired or lost function of the nerves, or of interrupted action, owing to extraneous influences or morbid productions in their vicinity. In all cases, however, the absence of organic change in the ear itself should be previously made out. Dr. Kramer states that most writers on the diseases of the ear — that Saunders, Swan, Lentin, Beck, Vering, J. Frank, and Saissy, have been incapable of determining this preliminary part of the investigation; that Curtis, Stevenson, and Wright are still worse authorities; and that Itard and Deleau are alone deserving of any confidence. Having consulted with M. Itard, and frequently referred to his writings, I can bear testimony to his science and candour, and to the great value of his contributions to this department of medical knowledge.

26. Dr. Kramer, with much of the spirit of the craft, but also with the science of the physician, severely criticises the writings of his contemporaries; rejects the distinctions of Itard, which, however, appear to me more scientific and correct than his own; and proposes a novel division of nervous deafness, and a new mode of treatment. He divides it into two forms, — the one attended by excitement or erethism — the other by torpor. Noise in the ears is always present in the former, but never in the latter. This symptom is often, however, attendant on very different diseases of the ear, but in a very indeterminate and inconstant manner. To determine, therefore, whether deafness with noises in the ear proceeds from disease in the organ, or from nervous affection merely, minute investigation and the means of diagnosis already mentioned must be had recourse to. But these are also requisite in the torpid form of nervous deafness. Mr. Swan believes, that many cases, usually imputed to palsy of the auditory nerve, are occasioned by chronic thickening of the membrane lining the cavity of the tympanum, involving the small branches of nerves in this situation. This is not improbable; and, admitting it to obtain, Dr. Kramer's mode of diagnosis will not always succeed, nor determine the existence or absence of true nervous deafness. On this subject, the views of M. Itard are more pathological, and less empirical, than those of Dr. Kramer; and therefore, in the few observations I have still to offer, I shall chiefly follow him.

27. A. *Deafness may proceed from compression of the auditory nerve.* — In most instances, however, this source of the affection cannot be accurately determined. A tumour may be developed, or purulent formations, or extravasated blood, may exist, in the course, or in the vicinity, or near the origin, of the seventh pair of nerves, interrupting the passage of impressions made on the organ to the sensorium; but this condition often can be only surmised. Duverney and Sandifort found these nerves pressed upon by tumours; and Severinus observed them surrounded by serum and effused blood. — If the tumour or morbid collection be considerable, then the extension of paralysis to the nerves of vision and of smell may favour the conjecture. Bonet mentions a case in which hearing and sight were lost, and on dissection a tumour was found pressing on the nerves of these senses. Thomann records a similar instance to this. Itard found, in a man who had lost the hearing in the left ear, small tumours lying on the corresponding side of the cerebellum, and nearly two ounces of a thick fluid in the ventricle of the same side. In cases adduced by Lieutaud, in several detailed by Lallemand, and in some seen by myself, an abscess had formed in the part of the brain adjoining the ear, and, by pressure or consequent disorganisation, had destroyed the functions of the auditory nerve. (See art. Ear, § 21. *et seq.*)

28. *a.* The *Symptoms* of deafness from compression of the nerve of hearing are — severe and nearly constant headach, vertigo, noise in the ears, impaired sight, and weakness of the mental faculties, especially of the memory. The progress of this affection is generally very slow, although the internal disease producing it is ultimately fatal. In several instances mentioned by Itard, it continued some years without materially affecting the general health. In two instances the above symptoms continued upwards of fifteen years. I also have known cases nearly as long protracted

as these. The case is most protracted when it proceeds from a tumour or morbid growth within the cranium.

29. *B. Deafness from palsy of the acoustic nerve.* — M. Itard supposes that this nerve may be paralysed — (*a*) by a severe shock or commotion, — (*b*) by convulsions, — (*c*) by apoplexy, — (*d*) by fever, — and (*e*) from sympathy with some other organ. Without denying the possibility of these causes giving rise to palsy of the nerves of hearing, and even admitting that apoplexy or convulsions and fever will sometimes occasion it, yet the others may seem problematical. — *a.* It is probable that very loud noises, as a clap of thunder, or the explosions of artillery, may paralyse these nerves, especially as deafness from these and similar causes can be explained only after this manner, when symptoms of inflammation or of congestion of the ear, or of the brain, cannot be detected. M. Itard believes, that the shock occasioned by falls in the lower parts of the body, or the counter-stroke occasioned in this and other ways, also may paralyse the auditory nerves; but this cause seems more doubtful than the preceding. When deafness has been occasioned by loud noises, hearing often returns spontaneously in a few days or weeks; but if the deafness persists for some months, it is rarely removed by treatment.

30. *b.* Deafness sometimes follows *convulsions.* — This is most frequently observed in children under four or five years of age. Many of the cases of deaf-dumbness originate in the convulsions occurring during the first dentition. But the deafness may not be the result of the convulsions; both the one and the other more probably being produced by some lesion at the origin of the acoustic nerves, or by effusion into the fourth ventricle, or by some change at the base of the brain, or about the medulla oblongata. When the loss of hearing is complicated with palsy of one side, or of one limb, the nature of the affection may be inferred; but when this is not the case, and when hearing in both ears is lost, the exact nature or seat of lesion can seldom be determined or even surmised. M. Itard considers deafness occurring in this manner as quite incurable.

31. *c. Deafness from apoplexy* is a frequent occurrence; and may exist in one or both ears. — When hemiplegia has followed the apoplectic attack, the deafness is generally on the same side, and is then incurable; but when the patient is not far advanced in years, and when there has been no consecutive palsy, the affection of hearing may be somewhat ameliorated by the sole efforts of nature, or by the means about to be mentioned; but more frequently, especially in old persons, no advantage accrues to the hearing from treatment. — When deafness occurs early in *typhoid* and *infectious fevers*, it frequently continues after recovery from them. If a judicious application of remedies do not succeed in a reasonable time, and if the affection have been of long continuance, hearing is very rarely recovered.

32. *Treatment.* — When the deafness following these diseases is incomplete, and occurs in young persons, then blisters applied behind the ears, or moxas in the same situation; the vapour of æther, or of camphor; the internal use of stimulants, when there is no tendency to cerebral plethora; and the use of stomachic purgatives and alteratives, to promote the secreting and excreting functions, may be resorted to; but recovery of hearing in these cases may proceed as much from spontaneous changes in the circulation within the head, and in the state of nervous power, as from the remedies prescribed. (See also § 37.)

33. *d. Deafness is sometimes symptomatic of, or associated with, disorders of the digestive organs.* — In these cases, the affection is generally slight; but it is sometimes very considerable and difficult of removal. Impaired and disordered digestion, deranged biliary secretion and excretion, a foul or loaded tongue, tumid abdomen, a morbid state of the evacuations, and an unhealthy aspect of the countenance and of the general surface, generally characterise this form of deafness. — The *Treatment* consists chiefly in the exhibition of emetics, followed by stomachic purgatives, and in attention to diet and regimen. The purgatives should be often repeated, and sometimes even the emetics ought to be given from time to time. After the secretions and excretions have somewhat improved, tonics and deobstruents, and the preparations of iron, may be prescribed; and be aided by blisters, or moxas applied behind the ears. — The disorder of the digestive organs associated with deafness is sometimes also connected with *difficult dentition*, as justly remarked by Nuck, Hesse, and Itard; and occasionally the impaired digestive, assimilating and excreting functions, of which deafness is symptomatic, gives also rise to the production of *intestinal worms*. In these circumstances, the indications of cure are manifest. (See Dentition — *Difficult*; and Worms — *Intestinal.*)

34. *e. Idiopathic paralysis of the acoustic nerves.* — This affection has been defined by Itard to be a want of excitability in these nerves — a loss of their sensibility, independently of the circumstances or causes already passed in review. Its existence has been unjustly doubted by Dr. Kramer. M. Itard believes, however, that it may be congenital, or supervene at any period of life; but that it most frequently occurs after forty. It is often accompanied with headach, noise in the ears, and mental inaction. Numbness, or want of sensation in the external ear, is sometimes present. M. Itard has seen the organic sensibility of this part entirely lost in two instances. In old persons, this symptom is often observed in slighter degrees, and is attended by dryness of the meatus. This variety of deafness is generally ameliorated by warm or mild weather, and by loud noises; but, as soon as these cease, the affection returns to its former state. — It is *caused*, as well as aggravated, by mental exertion and fatigue; by masturbation, venereal excesses, and other depressants; by exposure to cold, currents of air, and humidity; and by the depressing passions. Its accession is imperceptible, and its progress very slow. Sometimes it continues long stationary; but it is little influenced by treatment. If the patient, however, be not far advanced in life, some advantage may be derived from blisters applied behind the ears, or from moxas, rubefacients, or stimulants, around the organ, and repeated from time to time; from the vapour of æther, or of camphor, conveyed into the meatus, or into the Eustachian tube; from tonics, with serpentaria, or arnica;

and from the preparations of iron. Electricity and galvanism have been employed in this variety, but with little or no permanent benefit.

35. *f.* Deafness, in its more complete states, may also proceed from *organic changes in the acoustic nerves.* SYLVIUS found them, on dissection, remarkably atrophied; a state probably consequent upon prolonged inaction. ACKERMANN observed them indurated; and MORGAGNI states that, in one case, they were entirely wanting.

36. *C. Deafness from Plethora.* — *a.* Congestion of the vessels of the head or of the ear is not infrequently productive of deafness; and this congestion may either be purely local, or connected with a state of general plethora. In cases of this kind, the patient complains of headach, vertigo, throbbing noises in the ears or head, or momentary inconsciousness; which are increased by warmth, by a stimulating regimen, and the horizontal position. This form of affection is most common early in life, and again at middle age, or soon after; and especially in those who are subject to hæmorrhoids unattended by discharge, and in females who have experienced an interruption of the catamenia, or in whom this evacuation has ceased. The strictly local state of the affection may follow suppressed evacuations of various kinds, or repelled eruptions, or even retrocedent gout; and modifications of it are occasionally met with in connection with secondary syphilis, and with herpetic or other chronic eruptions.

37. *b.* The *Treatment* should in great measure depend upon the existence of local plethora or congestion only, or upon this state being associated with general plethora. The pathologist will generally decide correctly in these cases: but when the affection has followed the disappearance of accustomed sanguineous or other discharges or evacuations, spontaneous or artificial; and when the pulse, habit of body, and temperament, indicate vascular fulness; then general bloodletting, repeated according to circumstances, local depletions, purgatives, and external derivatives, low diet, and regular exercise, will generally restore the hearing, if they be decidedly prescribed, and rigorously pursued. Deafness, however, from local plethora, and especially from congestion of the vessels of the organ, is not so easily remedied; and, when remedied, is liable to return. Local depletions, either from the vicinity of the organ, or from the anus, when there is a tendency to hæmorrhoids; blisters applied on the nape, and kept long open, or preferably issues or setons; deobstruent purgatives or aperients, regularly and long persisted in; the warm or vapour bath; and other means calculated to promote the cutaneous functions, and prevent them from being interrupted, will be most serviceable for this form of the affection. If it have followed the suppression or disappearance of some eruption, discharge, or external affection, derivatives to the extremities, &c., sinapisms, blisters, &c., should be resorted to. If it have occurred in connection with secondary syphilis, a mercurial course will remove it, unless organic lesion of the Eustachian tube, or in the cavity of the tympanum, &c., have taken place. When it is associated with herpetic, or other chronic eruptions on the skin, the same internal and external means which succeed in removing these, will also generally improve the hearing; especially alteratives, purgatives, diaphoretics, sulphureous, fumigating, and other medicated baths, and strict attention to diet, and to appropriate means for improving the digestive, the assimilating, and the excreting functions.

38. IV. DEAFNESS AND DUMBNESS most commonly proceed from acute or chronic *otitis,* in early infancy, giving rise to organic changes in the delicate and complex structure of the ear, especially in the labyrinth, and in the acoustic nerves; or from diseased changes near the origin, or in the course, of these nerves. — When deafness is *congenital,* one or other of these lesions may be inferred to have taken place in the fœtus; or the organ, or nerves of hearing, may be considered as having been imperfectly developed in some of their parts. Deafness and dumbness are very seldom remedied, and never if the deafness has been congenital. If the affection has arisen in infancy from disease of the ear, then the treatment may be carefully directed to the removal of the morbid conditions which that disease may be presumed to have occasioned; but the utmost attention must be paid to the history of the case, to the existing state of the organ and of the constitution, and especially to the phenomena connected with the brain and digestive organs. Cases of this kind are rarely treated with success; but, for this very reason, they should be placed under the care of a scientific medical practitioner, and be treated according to general principles, directed to the particular lesions of the organ, and to the pathological states of the system. That these cases ought not to be despaired of, is proved by the instances of success detailed by M. ITARD, in an instructive chapter on the subject.

39. V. OF CERTAIN REMEDIES RECOMMENDED FOR IMPAIRED OR LOST HEARING. — With a desire of restoring the affections of the ear to the care of the regular practitioner, from whom the pretensions and advertising assiduities of empirics have almost entirely removed them, I shall next take a brief survey of the principal remedies employed in the treatment of these affections. And here I may remark, that none but well educated medical men, pursuing other branches of practice, should undertake the management of these disorders; for they, only, are capable of ascertaining the various pathological conditions of which deafness is either an immediate, or a remote and indirect, consequence, and of appropriately prescribing means of cure — of employing these means without risk of injury to the function, or to the organ, or even to the brain, with which the organ is so intimately connected.

40. *A. Constitutional Means.* — *a. Vascular depletions,* general or local, are necessary when inflammatory action, or general or local plethora, is present. In other circumstances they are inadmissible. — *b. Purgatives* are required in similar states; and when deafness is associated with disorder of any of the digestive organs, and with costiveness. They were much praised by DIEMERBROECK, HOFFMANN, and FABER. — They are injurious in purely nervous deafness, unless conjoined with stomachics and tonics. — *c. Emetics* have been recommended by STOLL, LAVAUD, and KENNEDY; and are sometimes of service when the hearing is impaired by inflam-

mation of the ear, or by collections of mucus in the guttural extremity of the Eustachian tube, or when the affection is connected with deficient action of the biliary apparatus. In nervous deafness, they are useless, and, when congestion of the brain is present, they may be injurious. — *d. Tonics* and *stimulants*, especially the preparations of cinchona, of cascarilla, of iron, of serpentaria, of arnica, of camphor, of ammonia, the æthers, &c., have been very generally resorted to in nervous deafness, and sometimes with benefit, when judiciously employed. — *e. Alteratives* and *deobstruents*, especially *mercurials* and *iodine*, or a combination of them, may be severally prescribed when the deafness is dependent upon secondary syphilis, or upon constitutional vice, or is connected with chronic cutaneous eruptions. They may also be tried when thickening of the membranes of the ear, or of the Eustachian tube, or obstructions of the latter by mucus, are supposed to exist. — *f. Salivation* was recommended by Desault and Ettmüller, but is requisite only when the affection proceeds from venereal ulceration in the vicinity of the organ. — *g*. The preparations of *squills* internally have been advised by Lange, when the Eustachian tube is obstructed by mucus; and a course of *dulcamara* by Carrère, when deafness is associated with herpetic eruptions. *Sulphur* and the balsam of sulphur may be prescribed, as directed by Ruland, in these or similar circumstances.

41. *B. Of Local Remedies.* — *a*. Of these the most vaunted are *electricity*, *galvanism*, and *mineral magnetism* — but chiefly by those who are adepts in these departments of quackery. The inutility of, and even occasional risk from, these means have been shown by Haller, De Haen, Zetzel, Freese, and Treviranus. Dr. Kramer has examined the proofs as to the efficacy of *electricity* in deafness furnished by the most respectable of those who have written upon the subject; and has shown that not one case can be said to have been cured, although many have been made worse by it. The opinions of Itard and Deleau nearly coincide with those of Dr. Kramer. Many cases have been published as cures by *galvanism* and *mineral magnetism*; but the improvement, said to have occurred, has continued only as long as the excitement occasioned by the employment of these agents. In most cases, however, no benefit has been derived from them, or it has been apparent only, or has existed merely in the patient's imagination. In two or three instances, patients have conceived their hearing to have been somewhat improved by galvanism; but I have observed, that this sense has nevertheless become more and more impaired.

42. *b. Moxas* have been praised by Paroisse, Loder, and Itard. Dr. Kramer is not favourable to them; but the testimony of a person who has a favourite remedy of his own, and finds fault with nearly all other means, should be received with reservation. M. Itard, whose experience and opinion are equal to those of Dr. Kramer, are in favour of them, in the cases in which they have been prescribed above. — *c. Issues* and *setons* have been employed by Zacutus Lusitanus, Ettmüller, Itard, and others, as derivative means. They should be inserted in the nape, or in the arm, in those states of the affection for which they have been already recommended. They will often prove inefficacious, or even injurious, if resorted to inappropriately; and especially in cases of idiopathic palsy of the acoustic nerves; or in old, enfeebled persons; or when the deafness has been caused by exhausting or depressing causes. — *d. Blisters*, applied behind and below the ears, and often repeated, or kept open, have been praised by Riedlin, Lavaud, Stoerck, Wendt, Itard, and others. Dr. Kramer considers that they, as well as the *tartar emetic ointment*, are indicated only in circumscribed inflammation of the auditory passage and membrana tympani. He prefers the ointment, which he rubs below the mastoid process, to avoid injuring this part. These means, however, admit of a more general application than he has allowed.

43. *C.* — *a. Masticatories* were prescribed in deafness by Wepfer, Diemerbroeck, Stahl, and Morgagni; but they are now entirely neglected. Several states, however, of this affection admit of a trial being safely given to them. — *b. Gargles* are amongst the most useful means that can be resorted to in those states of the affection which originate in acute or chronic disease of the throat. And when it is considered how very often inflammations of the ear, and deafness, are caused by lesions of the Eustachian tube, proceeding from the throat and posterior nares, especially during the various forms of cynanche, and in the course of eruptive fevers, the importance of these means cannot be overrated. These applications should be suited to the nature of the affection of the throat: in the more sthenic states of inflammatory action, they should be refrigerant, and contain the nitrate of potash, or hydrochlorate of ammonia, or borax; in the more asthenic forms of affection they may be astringent, tonic, and stimulant, and may also contain either of these, or some other, detergent substances.— When the occlusion of the guttural extremity of the Eustachian tube with mucus is suspected, these salts, especially the last, will be of service; and, when the deafness is in great measure nervous, the tincture of capsicum may be added to these, or to any other form of gargle that may be preferred. — In deafness connected with secondary syphilis (§ 20.), the bichlorate of mercury will be employed, in the form of gargle, with advantage.

44. *D. Drops* and *Injections*, especially those of a spirituous, irritating, or acrid nature, into the auditory passage, are justly considered by Itard and Kramer to be injurious. But various stimulating or rubefacient applications about or below the ear, as garlic, onions, rue, &c., have, according to Hoffmann, Müller, and others, sometimes been resorted to with advantage in nervous deafness. Dr. Turnbull recommends ointments with either *veratria*, *delphinea*, or *aconitine*, to be rubbed around the ear daily; or four or five drops of a spirituous solution of either of these (gr. ij—iv. to ℥ss. of spirit) to be dropped into the ear. — Of *perforation of the membrane* of the drum, notice has been already taken. Its want of utility, and the circumstance of its readily cicatrising, have been pointed out by Hufeland, Naase, Maunoir, Itard, and Kramer.— *Douches* of vapour or of water were formerly used in several affections of the ear.

Bartholin, Hoffmann, and Michaëlis, advised warm vapours, containing various stimulating substances, as camphor, æther, &c., to be directed into the meatus. These, however, require much caution and discrimination; but they may sometimes be of service, especially in catarrhal affections of the ear, and in idiopathic nervous deafness. Dr. Kramer undervalues these and other means, in order to enhance his own remedy (§ 45.).

45. *E. Injections into the Eustachian tube* were first recommended by Guizot; but Cleland, in 1731, first proposed them in a practicable mode, namely, by the nose; and Wathen long afterwards proved that a favourable result might be obtained from the practice. The injection of fluids into the tube was advised by Busson and others, to be performed by filling the mouth with the fluid; and, having firmly closed the lips and nose, by forcing it into the tube. — *Air* has also been directed to be forced into the tube, by Cleland and Sims, in the same way, in order to remove obstructions of it; and the smoke of tobacco has been similarly used, with the intention both of removing obstruction, and of exciting the organ, in nervous deafness, but with very equivocal results: I know one instance in which it proved decidedly injurious. Injections of medicated fluids, of vapour, and of air, into the Eustachian tube, by means of a suitable apparatus, have been severally resorted to by Itard, Deleau, and Kramer. — Besides injecting air as a means of diagnosis, Dr. Kramer throws into the tube, through a catheter introduced into it, the vapour of *acetous æther*, generated in a proper apparatus, at a summer temperature; but confines the practice to cases of nervous deafness characterised by torpor, or those unattended by noises in the ear. He also aids the local means by remedies intended to improve the constitution, and the digestive and other functions.

46. *F. Russian Vapour Baths* have been much recommended in deafness, especially when it has been supposed to originate in exposure to cold; and *warm*, or *fumigating*, or *sulphur baths*, have likewise been employed in these and other circumstances of the affection. They may all prove injurious in cases connected with congestion in the head or ears, or with general plethora. They are most serviceable when constitutional complaints—especially chronic cutaneous eruptions, or an obstinately harsh and unperspirable state of the general surface — are associated with the deafness; this latter probably depending in part upon a somewhat similar state of the ears to that of the skin and general system. In these cases they should be cautiously employed, vascular determinations to the head or to the ears having been previously removed, and morbid secretions and excretions freely evacuated.

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HEART AND PERICARDIUM — Diseases of the.

— Syn. Καρδία, Χέαρ, Χῆρ, Gr. *Cor*, Lat. *Das Herz*, Germ. *Cœur*, Fr. *Cuore*, Ital. Περικάρδιον, Gr. *Pericardium* (from περι, around, and καρδία, the heart). *Péricarde*, Fr. *Der Hertzbeutet*, Germ. *Pericardio*, Ital.

1. I. Introductory Remarks. — The progress that has been made in the knowledge of the diseases of the heart, may be dated from the appearance of the writings of Hartenfels, Bonet, Vieusseux, Lancisi, and Barbeyrac, towards the close of the seventeenth, and at the commencement of the eighteenth, century. Lancisi first directed attention to lesions of the valves, and to hypertrophy, of the heart, as causes of sudden death. Morgagni, Senac, Meckel, Juncker, and Spaventi, further advanced our knowledge of these diseases; but, from the middle of the last century, when the work of the last-named writer appeared, until the beginning of the present, when Corvisart wrote, this department of pathology was completely neglected. With Corvisart, the recent progress that has been made in it may be said to have commenced. His work was soon followed by that of A. Burns, by the engravings of Baillie, and by the fragment of Farre, in this country; and by the works of I. Warren, in North America; of Testa, in Italy; of Kreysig, in Germany; and of Bertin and Laennec, in France. Still more recently, the publications of Louis, Andral, Williams, Elliotson, Hope, Stokes, Watson, Latham, Corrigan, Bouillaud, and the con-

tributions of many others, have further enriched this department of our science.

2. i. *Of certain Topics relative to the Structure and Actions of the Heart in Health*, &c. —*a*. The *layers of muscular fibres*, and their various and tortuous directions, in the different compartments of the heart, require not particular notice here. According to M. Gerdy, these layers amount to six in the left ventricle, and only to three in the right; in both auricles, there are two in each. The muscular tissue of the right auricle is less abundant than that of the left, and leaves minute intervals between its fibres, allowing the external and internal membranes to come in almost immediate contact. To this circumstance M. Bouillaud imputes the frequent association of inflammations of these membranes. The muscular fibres of the heart are more distinct in the fœtus than in the adult; this organ only participates in the general paleness of muscles at that epoch, although it is deeper coloured than they. It is also entirely without fat at this period. In corpulent persons, the external layers of muscular fibres, especially at the base, are covered with fat; which sometimes presents a watery or gelatinous appearance in the cachectic or leucophlegmatic. In old age, the texture of the heart becomes soft and flaccid, and the parietes of the cavities thin. The cavities themselves enlarge, especially the right; and the surface of the organ is charged with fat. —The *chordæ tendineæ*, the whitish *zones* at the base of the valves forming the contour of the orifices, and the *interior of the valves* themselves, are principally formed of fibrous or albugineous tissue, which often becomes, especially in the latter situation, the seat of serious lesions, particularly in persons advanced in life.

3. *b*. The *internal surfaces* of the heart, as well as the parts just named, are covered by a transparent, pellucid, and whitish membrane, resembling the most attenuated serous membranes. It is more delicate in the right than in the left cavities; and the least so in the auriculo-ventricular and arterial orifices. It is readily stained by the colouring matter of the blood, owing to imbibition during certain states of this fluid. It is perfectly smooth and polished; but, in the situation of the orifices, where it is thickest, it often becomes rough or uneven, from chronic inflammation, which most frequently occurs in these parts, and in the valves. It is connected to the fibrous and muscular tissues by a fine cellular substance, which often is thickened, or otherwise altered by disease.—This membrane has been appropriately called the *Endocardium* (from ἔνδον, within, and καρδία, the heart) by M. Bouillaud.—It adheres so firmly to the adjoining tissues, that it can be detached only in small pieces; but, in certain diseases, it can be removed in large shreds. At the base of the valves, where the two layers of this membrane separate to receive the tendinous rings bordering the orifices, the *endocardium* and *pericardium* are nearly in contact with each other, or are connected merely by a fine layer of cellular tissue. This state of structure, and its connection with the inclosed fibrous tissue, explain both the frequent coexistence of internal and external inflammation of the heart, and the intimate connection often existing between these inflammations and rheumatism.—*c*. Of the *pericardium* it is unnecessary to say more than that it is a serous membrane, forming, as in all other situations, a shut cavity, reflected over the heart, and origin of the large vessels, and over the fibrous bag inclosing this organ. Its free surface is polished, smooth, and bedewed by an exhalation preventing friction, and the production of any sound; but, when it is diseased, morbid sounds, as well as other phenomena, result.

4. *d*. The *nerves* of the heart have been a subject of interest with pathologists. They are derived chiefly from the ganglia of the great sympathetic, a few only coming from the pneumagastric; but these latter seem rather to inosculate or communicate with the plexuses of the former, than to directly supply the texture of the organ. The cardiac ganglion seems more particularly to preside over the actions of the heart, or to re-enforce with additional energy whatever it may receive from other sources, especially from the centre of the ganglial system, and the other ganglia in the neck and chest. These nerves supply the substance of the heart in two ways:—1st. There are numerous branches which proceed from plexuses directly to the muscular texture, and which, dipping between the fibres, give off minute fibrillæ to the muscular fibres next to them in their descent into the substance of the heart; —2d. A large portion of the cardiac nerves form a reticulum around the coronary arteries. A part of these follow the arteries to their distributions; but before these arteries are ramified minutely, a part of the nerves surrounding them is detached to adjoining tissues, so that *all* the nerves reticulated around the coronary arteries do not accompany them to their ultimate distributions or terminations.

5. *A. The Actions of the Heart* may reasonably be referred chiefly to the influence which the ganglial nervous system bestows on the muscular structure of the organ.—Haller attributed them to *irritability*, or a peculiar power inherent in the muscular fibres themselves. But I have contended in several publications, since 1820, that the ganglial system is the source of irritability; and the same view has been more recently adopted, and ably supported, by Dr. Fletcher. The experiments of Willis, Home, W. Philip, Clift, Brachet, and others, show, that the actions of the heart are independent of the cerebro-spinal nervous power, although they are influenced by it. In experiments, which I performed, in 1818, on several species of fish, the heart continued to contract, not only after the destruction of the cerebro-spinal axis, but even for some time after it was removed from the body. Cases, also, have been observed by Lallemand, Lawrence, and others, of the absence of both the brain and the spinal chord, and yet the circulation continued for a considerable time after birth. An instance very nearly of this kind has very recently been observed by my colleague Dr. Sweatman. Humboldt found that the contractions of the heart, even after the removal of it from the chest, were more frequent and forcible, upon the application of the galvanic current to one of the cardiac nerves; and Home and Weinhold obtained nearly similar results from their experiments. In 1820, I repeated these experiments, and the phenomena were the

same as observed by these physiologists. The more recent researches of M. BRACHET show the justness of my views as to the dependence of the heart's action upon the ganglial system, and which were published twelve years before the appearance of his work upon this system. In my publications on this subject, it has been further contended, that *irritability* does not exist as an independent principle, but as one of the vital manifestations of this system, exerted through the medium of muscular or fibrous tissues.

6. *B.* Such, therefore, being the source of the heart's action, the *chief seat of action* requires some notice. — I believe that too much importance has been attached to the auricles, in estimating the motions of the heart; and that the contractile force of these compartments is much less than is supposed. From some experiments I performed about twenty years ago, I concluded that the actions of the heart should be referred chiefly to the ventricles, and agreed with HAMBERGER in allowing them a dilating power; but considered that Dr. CARSON pushed this opinion too far. I further observed, that if the dilatation of the ventricles were a result of a relaxation of their parietes merely, the cavities would not be so quickly and perfectly filled by the mechanical pressure of the blood as they are; and dilatation would be only the consequence of this pressure, and be proportionate to it. But such is not the case; for, on close observation, the dilatation always appears as the cause of the flow of blood. The opinion of M. BOUILLAUD nearly agrees with the above inferences, published by me in 1824. He, however, considers the injecting powers of the auricles to contribute to the dilatation of the ventricles, and attaches too much importance to the elasticity of their muscular parietes in aiding this action. If the contractions of the auricles were as energetic as commonly believed, a valvular apparatus would have existed between them and the roots of the large veins. The actions of the ventricles should, therefore, be viewed in the double light of *energetic contraction*, and *active dilatation*; by means of the former, the blood is propelled along the arteries, and, by aid of the latter, it is drawn into the ventricles, as well as into the auricles, a current from the smaller veins being thus kept up towards the heart. (See *Notes and Appendix to* M. RICHERAND's *Elements of Physiology, &c.*, by the Author.)

7. ii. *Of the Weight and Dimensions of the Heart in Health and Disease.* — *A.* It is obvious that no precise idea can be formed as to atrophy and enlargement of this organ, without having previously determined the dimensions and weight of it in health. This M. BOUILLAUD has endeavoured to ascertain. The following results are abstracts of his researches, and are given in the French weights and measures. He considers that the common opinion of the closed hand being the size of the heart of the same person is very nearly the truth; and that the opinions of CRUVEILHIER and LOBSTEIN as to the weight and size of the healthy organ are neither precise nor correct. In fourteen cases — (*a*) The *heart's medium weight* was 8 oz., 3 dr. (9 oz. 4 dr.), the greatest being 11 oz., and the least 6 oz. 2 dr., but its weight varies with the size of the person: it also is less in females than in males. The heart cannot be said to have arrived at its full development until 24 or 25 years of age. — (*b*) The medium *circumference of the heart*, at the base of the ventricles, was 8 inches 9 lines, the least being 8 inches, the greatest being 10 inches 6 lines. — (*c*) The *medium thickness of the walls of the left ventricle* was $6\frac{1}{2}$ lines, the maximum being 8, and the minimum 5 lines. The *medium thickness of the parietes of the right ventricle* was $2\frac{3}{5}$ lines, the maximum being $3\frac{1}{2}$, the minimum $1\frac{1}{2}$ line. The *interventricular partition* was 7 lines in thickness. The *medium thickness of the parietes of the left auricle* was $1\frac{1}{2}$ line; that of the *right*, 1 line. — (*d*) M. BOUILLAUD confirms the statement of LEGALLOIS, that the *medium capacity* of the right ventricle is somewhat greater than that of the left; and that of the right auricle greater than that of the left. — (*e*) The *circumference of the left auriculo-ventricular orifice* is about 3 inches 6 lines; that of the *right*, 3 inches 10 lines; that of the *ventriculo-aortic orifice*, 2 inches $5\frac{1}{2}$ lines; and that of the *ventriculo-pulmonary orifice*, 2 inches $7\frac{3}{4}$ lines.

8. *B.* Of seven cases of *atrophy of the heart* — (*a*) The *medium weight* was 175 grammes (or scruples = 7 oz. 2 dr. Eng.); the maximum being 200, the minimum 135 grammes. — (*b*) The different compartments of the organ, in a state of atrophy, generally preserve their relative dimensions. Sometimes, however, the parietes of the ventricles retain their usual thickness, chiefly from contracting on themselves and diminishing their capacity. In atrophy, also, the mean weight of the organ may be much lessened, whilst the dimensions of the whole, or of certain compartments of it, may not be sensibly, or may be only slightly, diminished.

9. *C.* In *hypertrophy of the heart* — (*a*) The *mean weight* of thirteen cases was 473 grammes (scruples) 5 grains; the maximum being 688, the minimum 338 grammes. — (*b*) The *mean circumference* of the organ was 11 inches $10\frac{2}{3}$ lines, the maximum being 12 inches, and the minimum 8 inches 10 lines. — (*c*) The *mean thickness* of the *left ventricle* was $10\frac{1}{2}$ lines, the maximum being 1 inch 1 line, the minimum 7 lines. — (*d*) The *mean thickness* of the *right* was $3\frac{7}{8}$ lines; the maximum being $4\frac{1}{2}$, the minimum 3 lines. The mean thickness of the *left* and *right auricles* was $2\frac{1}{6}$ lines, and $2\frac{1}{4}$ lines respectively, — that of the *interventricular partition* being $9\frac{1}{4}$ lines. — (*e*) The *capacity* of the left ventricle was generally more or less increased; that of the right was also increased in one third of the cases. In three instances the capacity of the ventricles was diminished. — (*f*) The *circumference* of the *left auriculo-ventricular orifice* was increased in three cases, in one of them to 4 inches 3 lines; that of the *right* was augmented in five instances, in one of which it reached 5 inches 9 lines; and that of the *ventriculo-pulmonary orifice* was increased also in five, and reached in one 3 inches 6 lines.

10. iii. *Of the Sounds of the Heart.* — In the article on AUSCULTATION, I stated the received opinions as to the sounds of this organ, and remarked that the subject required further investigation. Since that time, several able inquirers have entered upon it, and may be said to have settled the question. HARVEY and

Haller described the contractions of the auricles as preceding those of the ventricles. This, the true view of the matter, was departed from by Laennec, who conceived that the contractions of the auricles followed those of the ventricles. The researches of Turner, Corrigan, Williams, Hope, and Bouillaud, have shown the inaccuracy of Laennec's opinion. Dr. Williams, especially, has assiduously investigated this subject; and, as his inferences have been upon the whole confirmed by the committees of the British Association, I shall follow him chiefly in the few remarks which remain to be made respecting it. — 1st. The contraction of the ventricles, following immediately that of the auricles, is accompanied by the *first* or *dull sound*. This *systole*, by straightening the anterior convexity of the ventricles, brings the apex of the heart into forcible contact with the ribs, and thus produces the *impulse* or shock. The systole, by throwing an additional quantity of blood into the arteries, causes the arterial pulse, which is synchronous with the systole in arteries near the heart; but, in those more distant, succeeds it at an interval occupied by the transmission of the wave through the blood along the elastic tubes from the heart. — 2d. The systole of the ventricles is immediately followed by the *diastole*, which is attended by the *second* or *short sound*. — 3d. There is afterwards an interval of *rest*, at the conclusion of which the auricles contract, and the series of motions is repeated as before. The points which here remain to be settled are — (*a*) the way in which the systole of the ventricles produces the first sound; and (*b*) how the diastole causes the second.

11. The *first sound* was ascribed, by Mr. Carlile, to the rush of blood into the great arteries; by M. Rouanet and others, to the closing of the auriculo-ventricular valves; by Dr. Hope, to the collision of the particles of fluid in the ventricles; and by Dr. Williams, to the muscular contraction itself. — The *second* or short sound was ascribed, by Dr. Hope, to the impulse of the blood from the auricles refilling the ventricles; by Carswell, Rouanet, Carlile, Bouillaud, and others, to the suction of the ventricles causing the elevation of the sigmoid valves, and to the reaction of the arterial columns of blood against these valves. The experiments performed by Dr. Williams, assisted by Dr. Hope and several other able physiologists, in order to determine these points, proved, that the *first sound* is produced by the muscular contraction of the ventricles; and that the *second sound* is caused by the reaction of the arterial columns of blood tightening the semilunar valves at the diastoles of the ventricles. — Dr. Williams, Dr. Hope, and M. Bouillaud, concur in considering the *impulse* or stroke of the heart to be effected by the apex alone; whilst the experiments of the Dublin Committee seem to show that the body of the ventricle is also concerned in producing it. The London Committee admit that the first sound is caused by muscular tension, but think that the impulse may be an accessory. In other respects they all tolerably agree.

12. iv. *The morbid Actions and Sounds of the Heart* have been very fully considered in the article Auscultation (§ 25.). Little, therefore, remains to be noticed respecting them at this place, beyond a brief mention of the views of some writers of eminence that have appeared since that article was published. — *A.* As may be expected, *à priori*, the duration of the systole seems often to be prolonged by the difficulty experienced by the blood in passing through the morbid arterial orifices. Continued and violent palpitations, particularly in cases of hypertrophy, tend eventually, according to the observations of M. Bouillaud, to produce marked prominence of the præcordial region. I have remarked this, also, in cases of sub-acute and chronic pericarditis. In a case of pericarditis, complicated with rheumatism of the joints, in a child seven years of age, who was long under my care, this prominence and the palpitations were remarkable; but, after a time, these disappeared, and the lower half of the sternum, with the cartilages of the ribs, became drawn inwards, and towards the spine, to such an extent as to form a very remarkable cavity in the præcordial region. This occurrence was so singular, that I caused the patient to be shown to several of my colleagues at the Middlesex Hospital. It appeared to have arisen from adhesion of the pericardium to the heart, and from the subsequent atrophy of the latter.

13. *B.* The *intensity of the sounds*, as well as of the impulse of the heart, varies remarkably. — In some instances the sounds are feeble, and heard with difficulty; whilst in others they are heard at a distance of two or three feet. Although the impulse against the ribs does not produce either of the natural sounds, yet, in violent action of the heart, the more sudden and abrupt strokes cause a sound, constituting the termination of the first sound in these cases, and which seems nearer the ear, and more like a knock, than what is heard in the ordinary action of the heart. The sounds may assume a dry or hard character, which Bouillaud imputes, but I think incorrectly, to hypertrophy and rigidity of the mitral valve; or they may be large, hoarse, or rough, owing, as he thinks, to a fungoid or infiltrated condition of the valves, which are then soft and flaccid. — The saw sound sometimes has a peculiar *hissing* character, and at others a thick or *rough tone;* but all these are merely modifications of the bellows-sound, and are very commonly connected with narrowing of the orifices of the compartments. Laennec considered them to proceed from spasm, of the existence of which, however, we have no satisfactory proof. — A sound, which varies in tone from the *cooing* of a dove to the *chirping* of birds, or the *sibilous* noise of bronchitis, is more rarely heard: I have heard it only twice. It has also been noticed by M. Bouillaud, Rouanet, and, I believe, by Dr. Watson. It seems connected with narrowing of the orifices. I heard it in a case of rheumatic pericarditis in a child. — The *bellows*, or *blowing sound*, M. Bouillaud asserts, has been heard in upwards of a hundred cases, where contraction of the orifices, with induration of the valves, was established by dissection; whilst M. Piorry states, that his experience is at variance with this result. An able reviewer (*Brit. and For. Med. Rev.* No. ii. p. 451.) very justly remarks, that, although cases of well-marked contraction, with ossifications, &c., do present themselves, unaccom-

panied by any such abnormal sounds, such occurrences are extremely rare, and form only the exception, and not the rule, as M. Piorry would have them to do. It should also be kept it mind that the morbid sounds may be produced by a refluent, as well as by an onward, motion of the blood, as M. Filhos has contended.

14. M. Bouillaud considers that the *bellows sound* may proceed from — 1. Narrowing of the orifices, with induration of the valves;—2. Smallness of the aortic orifice, although the valves are quite healthy;—3. Polypous exudations, resulting from acute inflammation of the endocardium; — 4. Irregularity or roughness of the surface of the valves, or vegetations, or calcareous incrustations on them; — 5. Infiltration of the valves from inflammation; — 6. Adhesions of the auriculo-ventricular valves to the adjacent parietes; — 7. Dilatation of one or more of the heart's orifices, with consequent inefficiency of the valves; — 8. Hypertrophy, with dilatation of the left ventricles, although unattended by narrowing of the orifices; — 9. Chlorosis, anæmia, and nervous affections of the heart, in some instances;—10. Extreme debility from hæmorrhage, or other depressing causes. It has been supposed that the bellows sound, which is not constant, or is only occasional, in the three last circumstances may arise from spasm. M. Bouillaud believes it to depend in these on a narrowing of the orifices, to adapt themselves to the diminished quantity of blood circulating through them. He further considers that all the above cases are reducible to one common principle, namely, increased friction produced in some of them by the direct, in others by the refluent, current of the blood; but most frequently from the former cause. From this it is evident — and most experienced practitioners must have arrived at the same conclusions, from their own observations — that it is impossible to decide, from the bellows sound alone, in which of the orifices, if in any, the lesion is seated. The co-existence of this sound with the systole or diastole, and the situation in which it is loudest, may assist the observer, but still no accurate conclusion can be formed as to its precise cause. — When the *sawing* or *rasping sound* is heard, the alteration may be considered to partake more or less of an osseous nature.

15. C. The *sounds produced* occasionally *by the surfaces of the pericardium* in a state of disease, were overlooked by Laennec, and have only recently received attention. It is chiefly to Collin, Reynaud, Honoré, Stokes, Williams, Mayne, and Bouillaud that we are indebted for observations respecting them. M. Bouillaud divides these sounds into three varieties. — 1st. The *rubbing sound*, resembles that caused by rubbing together two pieces of silk, or of parchment. It is to be distinguished from a similar sound produced by the pleura, by its being double and synchronous with the heart's action. It is most obvious in the systole, and is diffused over a considerable surface. — 2d. The *creaking sound*, is altogether similar to the creaking of leather, or of shoes, or of a saddle. M. Bouillaud remarked it once; M. Andral only once, and Dr. Williams in three cases. M. Collin and others have also heard it. I have met with it in two instances; one of them a boy, about ten years of age; the other a young lady of about twenty, who, in 1833, came from Brompton to consult me. She had, several months previously, experienced an attack of acute pericarditis; and, whilst describing her symptoms to me, she herself likened the morbid sound she heard in the præcordial region to the creaking of new shoes. I heard it distinctly with the unassisted ear. — 3d. The *scraping sound*, is such as may be expected to be produced by rubbing a rough and hard cartilaginous or osseous body against the pericardium. Its synchronism with the motions of the heart distinguishes it from similar morbid sounds originating in the pleura. M. Bouillaud states, that the two first sounds occur only in acute pericarditis. In the two instances I met with, there had existed the acute form of this disease; but it had long before subsided, leaving after it organic lesion, or at most a chronic state of inflammation. The friction, or rubbing sound, in its faintest states, occurs in the early stages of acute pericarditis, and whilst the membrane is dry. The creaking or leathery sound seems to arise from thickening or condensation of the subserous and serous tissues of the pericardium, especially of the portion reflected over the heart; and the formation of a dense and elastic false membrane, with, perhaps, more or less adhesion of the opposite surfaces. The scraping or grating sound is caused by lesions which occur only in the more protracted cases of chronic pericarditis. — When the bellows sound is heard in pericarditis, it does not necessarily depend upon this disease, but rather upon the coexistence of inflammatory action in the internal membrane of the heart, or the extension of it to the fibrous structure of the orifices or of the valves, and the consequent contraction or other lesions thereby occasioned.

16. v. *Percussion of the Cardiac Region* is best performed with the index finger of the unemployed hand as the medium, or plessimeter. In the healthy state, the extent of the dull sound generally varies from an inch and a half to two inches square, which answers precisely to the extent to which the heart is disengaged from the lungs. The extent of the dulness increases very much in hypertrophy of the organ with or without dilatation of the cavities, in simple dilatations, and in congestions of them occurring in various diseases. It is not unusual to find the dulness, in these circumstances, extending to five or six inches square. (See art. Auscultation.)

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II. A General View of Diseases of the Heart. — Syn. Καρδίας νόσοι, Gr.; *Cordis Morbi*, Lat.; *Herzkrankheiten*, Germ.; *Maladies du Cœur*, Fr.; *Malattie del Cuore*, Ital.; *Diseases of the Heart*, *Heart-Diseases*.

17. As the various maladies of the heart frequently proceed from the same causes, often are met with in similar states of complication or association, admit often of the same prognosis, and even frequently require the same modes of treatment, I shall, in order chiefly to prevent repetitions, take a general view of them before I proceed to consider their specific forms.

18. i. The *Causes of Diseases of the Heart* are even more diversified than was supposed by Corvisart and some other writers. — *A.* The *Predisposing Causes* are nearly the same as those concerned in producing inflammatory and nervous diseases in other organs; but the unceasing actions, and the intimate sympathies, of this viscus, not only increase the general predisposition, but also serve to impart a peculiar character to the effects more immediately produced on it by numerous physical agents and moral influences.— The irritable, nervous, and sanguineous temperaments; a plethoric habit of body; the rheumatic and gouty diathesis; depression of mind; and the puerperal states, favour more or less the occurrence of diseases of the heart. Lancisi, Albertini, Senac, Morgagni, Corvisart, Bouillaud, and others, have remarked an hereditary predisposition to these diseases, independently even of either of the diatheses just particularised. Besides these, susceptibility of the nervous system, whether original or acquired; and pre-existent disorder, especially debility in its various forms; impaired digestive, excreting, and assimilating powers; morbid states of the blood, affections of the lungs and liver, and irritations of the uterus and spinal chord, predispose more or less to these maladies.

19. *B.* The *Exciting Causes* may be arranged into — 1st. The Mechanical and Traumatic; — 2d. The Physical; — 3d. The Moral; — and, 4th. The Pathological. — *a.* Under the *first* of these may be arranged blows, falls, wounds, and external injuries, directly or mediately affecting the organ; compression of the ribs or sternum, or of the hypochondria, by resting against a desk, and by strait lacing; and over-distension of the stomach by food or drink. — *b.* Amongst the *physical causes*, may be enumerated — great muscular exertion, especially while the breath is retained; long journeys on foot, and fatigue; running against the wind, or ascending eminences or stairs; reading or speaking aloud, and singing, especially if long continued, or when empassioned; blowing wind instruments; straining at stool; advanced pregnancy; excessive venereal indulgences; the abuse of spirituous or fermented liquors; arsenical preparations in poisonous doses, or employed too long or in too large doses as a medicine; the injudicious use of other acrid substances; exposure to cold, or to cold and humidity conjoined, and to currents of cold air; wearing damp linen or clothes, or sleeping in damp beds or sheets; and drinking cold fluids, or eating ices when the body is perspiring. — *c.* The *moral causes* comprise all the depressing and exciting affections of mind, especially when excessive, but more particularly the former. Sudden shocks, fright, terror, violent fits of anger, anxiety, grief, sadness, nostalgia, amorous affections — all not merely affect the functions of the heart in a very remarkable manner, but sometimes also alter its structure.

20. *d.* The *pathological causes* are still more influential than the causes already enumerated; and act in different ways. — 1st. Some of them embarrass the actions of the heart, by impeding the functions of the diaphragm and lungs, as flatulent distension of the stomach or colon; enlargement of the liver, or of the spleen, and effusions of fluid in the large cavities. — 2d. Others obstruct the circulation through the lungs, and consequently cause congestion or distension of the heart's cavities, as asthma, hooping cough, pneumonia, bronchitis, convulsions, &c. — 3d. Certain pathological states extend to the heart or pericardium from other parts, owing either to proximity of situation, or to their structure being of the same kind as that of the parts previously affected. — Thus inflammation of the external or internal membrane, or other diseases, of the heart, appear in the course, or after the subsidence, of pneumonia, of pleuritis, of rheumatism, &c. — 4th. Some of these causes are connected with excessive vascular plethora, with or without a morbid condition of the circulating fluids, as the suppression of eruptions or discharges, and interrupted or impeded action of any of the principal assimilating and excreting organs. That the blood may become morbid, owing either to the imperfect assimilation and the injurious nature of the ingesta, or to the accumulation in it of the ultimate products and effete principles of assimilation requiring to be eliminated by the energetic action of the emunctories; and that this state of the blood may excite disease in some part of the heart's internal surface, seem more than probable. — The changes in the circulating fluids, moreover, taking place in the course of fevers, or in connection with the exanthemata, erysipelas, gout, &c., may also occasion disease of this organ; and it is not unreasonable to infer, that, when this connection is observed, as much is often owing to the morbid condition of the blood, as to that of the living solids. — 5th. In cases of suppression of gout or rheumatism, or the retropulsion of the exanthemata, and of other acute cutaneous eruptions, it may be admitted, that whilst the constitutional disturbance, upon which the local or external affection depends, remains unabated, the suppression of the latter will very probably be followed by some prominent affection, or localisation of morbid action, in an internal organ, especially if the powers of life are inadequate to throw it off upon some external part; and as, in these diseases, the circulating fluids are more or less altered, and the actions of the heart already much disturbed, one or other of the tissues or compartments of this organ will be quite as likely to become the seat of the superinduced

malady, as any other internal part; and even more so, as respects rheumatism, owing to the predisposition arising out of identity or similarity of structure. — 6th. One affection of the heart, functional or structural, may occasion another, or an additional lesion. Thus violent palpitations sometimes rupture a muscular column, or tendon, of the valves, or even the parietes of the heart itself; and narrowing of an orifice occasions dilatation of the cavity behind it, &c.

21. Whilst CORVISART and SCHINA have attached the greatest share of importance to moral causes in the production of cardiac diseases, and undervalued the influence of physical agents, M. BOUILLAUD has over-estimated the latter, at the expense of the former; and they, as well as all other writers, have either entirely overlooked, or have scarcely adverted to, several of the antecedent changes, or pathological states, to which I have imputed so much in the causation of these maladies.

22. ii. *Of the Seat and Anatomical Characters of Diseases of the Heart.* — *A.* It is extremely rare, as M. BOUILLAUD remarks, to find the heart altogether diseased: most commonly a compartment only, or a portion of it merely, or even one of the tissues constituting it, is affected. Sometimes one or more valves, or orifices, are primarily altered; and in other cases, either the internal or external membrane, or the muscular structure, is changed. In one instance, a cavity is dilated, and its walls thinned; in another, it is of natural capacity, but its parietes are remarkably thickened; and in others, the compartments individually present various lesions, as softening, hardening, &c.

23. *B.* The *intimate nature* of the heart's lesions is not always evident, even on the most minute examination. That they are frequently inflammatory, or of that kind usually so denominated, cannot admit of doubt; and that they still more frequently are the consequences of inflammation in some one or other of its grades, modified, however, by the tissue in which it is seated, by the state of vital power attending it, and by the condition of the circulating fluids, is not less true, although less manifest, than the former proposition. Inflammation affecting a serous surface gives rise to results varying with its intensity and with the state of the constitution, in respect both of organic nervous energy and of vascular tone. When the latter remain unimpaired, the production of coagulable lymph is a common result; but the lymph, being secreted in a fluid state, will often, when the internal membrane of the heart is inflamed, be washed into the current of the circulation before it can be coagulated, and no very manifest evidence of the disease may be detected after death, although it has existed in its most intense form, or even has been the cause of death. When the inflammatory action is co-existent with depressed vital power, and a morbid state of the blood, the fluid secreted by the inflamed surface is incapable of coagulating, and it readily mixes with, and contaminates, the vital current; the seat of disease presenting after death but little change, beyond dark discolouration, and softening. In respect both of the internal surface, and of the substance of the heart, lesion of the capillary action and tone, as well as of vital cohesion, may have existed during life, and yet escape detection after death; and certain of the changes sometimes observed — especially alterations of colour, fibrinous coagula attached to the valves, &c., and slight effusion into the pericardium — have either taken place shortly before, or at the period of, dissolution, or even soon after this issue.

24. Although most of the affections and lesions of the heart are to be imputed chiefly to inflammatory action and its consequences, varied by the conditions alluded to, yet they are not altogether of this nature, or do not always originate in this way. We have seen above (§ 5.), that this organ derives its energies chiefly from the ganglial nervous system; it must, therefore, follow that extreme depression or exhaustion of this system must be attended by a marked alteration of the functions of the heart: indeed, the evident imperfection of the actions of the latter is one of the principal indications we possess of the exhaustion of the former. And, if this alteration or imperfection of action continues long, or returns frequently, lesion of structure, especially dilatation, softening, thinning, atrophy, &c. of the parietes of one or more of the compartments of the organ, &c., must ultimately take place. Nor is this the only mischief; for, along with it, alteration of the circulating fluid often exists, — this latter still further impairing nervous or vital power, — and, in connection with both these pathological conditions, inflammatory action, or an altered state of vascular action constituting one of the morbid conditions usually so denominated, occasionally also takes place in the internal surface of the heart, or in some other of its constituent tissues, giving rise to the further changes already alluded to in general terms, and hereafter to be more particularly noticed.

25. iii. *The general Characters and Diagnosis of Diseases of the Heart*, naturally divide themselves into — 1st. The *Local Signs*; and, 2d. The *general Symptoms*, or sympathetic phenomena. The former have been generally termed *physical*; the latter, *physiological* and rational: but the one class should always be considered in connection with the other in the course of practice. — *A.* The *local signs* are ascertained by *auscultation*, *percussion*, *inspection*, and *palpitation*. Of the former of these means, sufficient notice has been taken. (See arts. AUSCULTATION, and CHEST.) — The latter requires equal care with the former; and the sensations communicated to the hand of the examiner, as well as those excited in the patient by the examination, should be attentively ascertained and estimated. The indications furnished by these means are diversified according to the nature of the diseases which furnish them; but they can be known only by listening to the extent, seat, and nature of the sounds given out by the organ, or elicited by percussion; by observing the form and motions of the præcordial and adjoining regions; by feeling the motions, tremors, or thrills, often existing in these situations; and by ascertaining the sensations of the patient upon pressing between the ribs, or on the præcordia, or upwards upon the diaphragm, and under the anterior margin of the left floating ribs.

26. *B.* The *general symptoms*, or sympathetic phenomena, are ascertained from attentive observation of the several related functions. — The very intimate relation of the heart to all the

principal viscera, but especially to the blood and circulating vessels, to the organic or ganglial nervous system, and to the respiratory organs, and the influence which these exert upon this organ, and which it exerts upon them, severally and conjointly, require to be kept in view. The manner, also, in which the brain, the liver, and other digestive organs, are often affected by diseases of the heart, may likewise be made a source of information. Most of the connections which have been traced between affections of distant organs and the heart, have been imputed to augmented or impaired actions of the latter — most frequently to hypertrophy. But there is sufficient evidence to prove that interrupted circulation, caused by alterations of the valves or of the orifices, is much more concerned in the production of sympathetic disturbance, and even of structural lesion, of remote as well as associated parts, than hypertrophy, or excited action. An impeded passage of blood from the auricles occasions congestion of the venous system; serous effusion into shut cavities, and cellular or parenchymatous structures; hæmorrhages from mucous surfaces, or into the substance of organs; and not infrequently congestions or enlargements of the liver or spleen. When hypertrophy exists, it is generally caused by the increased action required to overcome an obstacle situated at the outlet from the hypertrophied compartment; yet still the obstacle is but imperfectly overcome, and the force of the current of blood beyond the seat of obstruction is even less than in health. The necessity, therefore, of ascertaining the pathological states of remote as well as of collatitious parts, in connection with the actions and sounds of the heart, in order to arrive at correct conclusions as to the diseases of the latter, is manifest. The relations of morbid actions must be duly estimated, without assigning a preponderating or an exclusive share to one or two conditions, and overlooking all the rest. No partial or empirical views should be entertained; and far less ought a charlatan-parade of examination be pursued and acted upon, to the neglect of physiological inquiry, and of rational deductions. There is as much empiricism at the present day in the modes of investigating and observing diseases, as in those of curing them; but there is this difference — that the empiricism of the former kind is much more *ad captandum* than the latter, and generally more fussy, and often more offensive.

27. iv. *Of the Nature and Arrangement of Diseases of the Heart.* — *A.* The *nature* of these diseases has been partially noticed, when viewing the alterations of structure attending or consequent upon them (§ 23, 24.). Of the intimate nature of these maladies we know nothing more than is intimated by function or action, or is made apparent on close inspection. — *a.* When disordered action is suddenly excited by mental emotions, or by affections of related parts, and as suddenly ceases, leaving the organ in the integrity of its functions, we infer that the disturbance is seated in, or extends to, that part of the organic nervous system which actuates it; and this view is confirmed by the *juvantia* and *lædentia*, and often by the appearances observed after death in persons who had been thus affected, and who had died of other diseases. In these cases, the disorder must, in the present state of our knowledge, be viewed as purely *functional*, or *nervous*, or *dynamico-vital*, as termed by various writers; and it may, without much stretch of ingenuity, be chiefly referred either to impaired action, or to excessive action. In these affections, the nervous system of organic life — particularly that part of it supplying the heart — is primarily disordered, and continues the only or chief seat of the disturbance for some time. But if either affection be excessive, or enduring, then alteration of structure may result, and assume one or other of the forms about to be noticed.

28. *b.* Diseases of a most serious nature often attack the heart, in which, conjointly with more or less disturbance of the organic nervous influence, the vessels supplying one or more of the constituent tissues of the organ, exert a morbid action, and give rise to various changes of structure, according to the grade of vital power, and to the state of the blood. These diseases frequently take place less obviously, or much more insidiously, than the foregoing, although often, also, in a severe and acute form; and they are always dangerous. The rapidity of their course, as well as the changes they produce, depends upon the intensity of the morbid vascular action, and the constitutional states just mentioned. From the circumstance of this action being attended by injection and development of the vessels, particularly of the capillaries, and giving rise to changes usually observed to follow inflammation in other parts similarly constituted, it has been denominated inflammatory. By this term, however, it is not intended to be implied that the morbid vascular action altogether consists either of diminution, or of augmentation, of the vital properties of the vessels; but that, as I have contended in the articles Disease (§ 87.), and Inflammation, it is rather an *alteration* — a *perversion* of these properties that constitutes inflammation, and not a change simply *dynamic*; this change, whatever direction it may take, forming only one of the elements of the morbid state. Beyond this, we can hardly advance in our analysis of the nature of inflammatory diseases of the heart; but we may infer, with some truth, that, when the organic nervous or vital powers are unimpaired, and the blood uncontaminated, the morbid vascular action will partake more or less of the excited or sthenic condition, will exert a formative process, and will most probably form lymph, which will coagulate if allowed to remain for any time in contact with the part which produced it; or occasion thickening, or a condensation of the affected parts; or give rise to other changes varying with the grades of action; — and we may further conclude, with equal justice, that, when the vital powers are depressed or exhausted, or the blood altered or contaminated, the local morbid action will be asthenic, will be incapable of developing the changes just specified, and, in their place, will produce, according to its seat, a sanious or sero-sanguineous fluid from the surfaces, that will further contaminate the blood, if the internal membrane be implicated, or give rise to softening, discolouration, &c. of the substance of the organ, if this part become affected.

29. — *c.* Under the above two heads may be comprised those affections of the heart which may be said to be primary, as respects this organ, although they are often associated with, or even

preceded by, disorder of other viscera, as well as by alteration of vital power and of the circulating fluids. But there is another class of cardiac diseases, which present different characters, and consist, in a great degree, of change of structure, often associated, however, with disorder of the organic nervous influence, and sometimes also with more or less marked alteration of vascular action in one or more of the constituent tissues, or compartments, of the heart. They may be said to proceed from the morbid conditions already discussed, especially when these exist in sub-acute, or in slight or chronic forms. That this is the case, will become apparent, when I come to describe them individually. It will then be fully shown, that impaired, or irregularly exerted, nervous influence, and morbid vascular action, in one or more of the constituent structures of the organ, have, together or singly, altered their nutrition, or impaired the vital cohesion of the molecules of which they are formed; and that the consequences of altered nutrition and impaired vital cohesion chiefly consist of the increased or diminished thickness and density, the augmented redness and elasticity, the softness, the dilatations, &c., of the parietes of the cavities; and of the fungous or polypous excrescences, the cartilaginous and osseous formations, and the different morbid productions, &c., found in the heart and pericardium.

30. *B.* Conformably with the above view of the nature of affections of the heart, I shall divide them into — 1st. *Disorders which are merely nervous, or functional, and chiefly dependent upon the state, or distribution, of the ganglial nervous influence, particularly in respect of this organ;* and under this head will be comprised — (*a*) *Impaired and irregular actions of the heart;* — and, (*b*) *Excessive action of the heart.* —

2d. *Diseases in which, conjointly with more or less disturbance of the organic nervous influence distributed to this organ, the blood-vessels of one or more of its constituent tissues manifest a perverted or morbid action.* Under this division will be considered — (*a*) *Inflammation of the endocardium or internal membrane of the heart;* — (*b*) *Inflammation of the pericardium;* — and, (*c*) *Inflammation of the substance of the heart, or carditis.* —

3d. *Organic or consecutive lesions of the heart, resulting from, and often associated with, one or more of the above pathological conditions.* Under this head will be discussed — (*a*) *Atrophy of the heart;* — (*b*) *Œdema of the organ;* — (*c*) *Softening and hardening of the structure;* — (*d*) *Adventitious productions in the heart;* — (*e*) *Changes of the dimensions of the orifices and valves;* — (*f*) *Changes in the dimensions of the cavities of the heart;* — (*g*) *Hypertrophy of one or more of the compartments;* — (*h*) *Rupture and wounds of the heart, &c. &c.*

31. v. *Of the Course, Termination, and Duration of Cardiac Disease.* — Affections of the heart may be *acute, sub-acute,* or *chronic.* — *A.* Those which are *nervous,* or functional, are most frequently chronic, remittent, or even periodic; yet they are sometimes acute, and of very short duration, as in cases of cardiac syncope, &c.; and frequently terminate without any lesion of structure, although they occasionally induce it. — *B. Inflammations* of one or more of the constituent tissues of the heart may assume any grade of intensit, and pursue accordingly an *acute* or *chronic* course, or even any of the intermediate or sub-acute states. The chronic form may be consequent upon the acute; or it, as well as the sub-acute, may appear primarily, especially when the inflammatory action is limited in extent, or is confined to a single constituent tissue of the organ. Although they may terminate in resolution, yet they most commonly give rise to organic changes, amongst which must be ranked the effusions of fluid, &c., frequently met with in the pericardium. — The more intense states of inflammation of either of the surfaces, or of the substance of the organ, may terminate fatally in two or three days, whilst the less severe or chronic states may continue months, or even years. But when they become thus prolonged, it is generally owing to their having passed into organic change, or to a temporary subsidence of the morbid action, and to returns or exacerbations of it, under moral or physical influences. — *C. Organic lesions* of the heart are extremely uncertain as respects their course, duration, and termination. Even when most manifest and extensive, their symptoms and progress are by no means uniform; the most distressing phenomena, as in inflammations of the organ, often varying, disappearing, returning, or pursuing very different courses, in separate cases, or even in the same person at different periods. They frequently, also, present more or less evident remissions and exacerbations, or even a marked periodicity. This circumstance probably induced Corvisart, and especially Rostan, to refer many cases of nervous asthma to organic disease of the heart. But this circumstance is explained by the fact already adverted to — that change of structure, even when most prominent, is only one of the elements of the cardiac malady, the organic nervous energy of the organ being also always more or less affected; and we know that intermittence, or periodicity, is characteristic of affections of the nervous system. — The exacerbations or violent paroxysms which patients with organic lesions of the heart experience, is not, however, altogether owing to periodicity of the morbid action, but is often excited by mental emotions, by errors in diet, by over-distension of the stomach or colon, by neglect of the excreting functions, and by exposure to atmospheric vicissitudes.

32. vi. *The Complications of Diseases of the Heart,* are important objects of consideration, in respect both of the associations of these diseases with one another, and of their connection with other maladies. — *A. Nervous affections* of the heart are often attendant upon disorders of the digestive organs, on flatulency, on congestions of the liver, and on disorder of the respiratory functions. They are frequently also observed in the course of chlorosis, hysteria, and anæmia; and are often excited by affections of the womb, and by the puerperal states. Indeed, the numerous pathological causes (§ 20.) of cardiac diseases form also complications with them. — *B. Acute or chronic inflammation* of the internal membrane of the heart sometimes extends to the pericardium; and inflammation commencing in the latter surface very frequently reaches the former. This association of inflammation of both surfaces, or extension of the morbid action from the one to the other, especially from the external to the internal membrane, is to be explained by the

proximity of the one to the other in certain parts of the organ, and by the circumstance of the connecting cellular substance being frequently implicated, especially when the pericardium is inflamed. This fact, which is much insisted upon by Bouillaud, has been taught in my lectures since 1825. — *C.* Inflammations of these membranes are also often complicated with, or consesequent upon, acute articular rheumatism, or inflammation of the pleura or lungs. This association is met with in a very large proportion of cases of these diseases. — *D.* The complication of *organic lesions* of the heart with those of the large vessels, and particularly those of the aorta, are well known; and of softening, dilatation, &c., with adynamic fevers, scurvy, purpura, &c., has been often remarked. The connection existing between obstructions at the orifices of the heart, and commencement of the large vessels, and hypertrophy; and between these and diseases in the lungs and brain, especially apoplexy, palsy, pulmonary hæmorrhage, effusion into the cavities of the chest, anasarca, &c.; will be more fully shown in the sequel.

33. vii. *The Prognosis of Cardiac Diseases.* — Senac and Corvisart entertained the most unfavourable opinion as to the result in diseases of the heart. The latter writer even affixed the epigraph — "*Hæret lateri lethalis arundo*" — to the titlepage of his work. At the present day, more favourable ideas are entertained on this subject, although the opinion of Corvisart will still hold with respect to some of the organic changes of the organ. — *a.* The *nervous affections* of the heart will frequently yield to treatment, unless they be very violent, when an unfavourable, or at least a guarded, prognosis should be given. — *b. Inflammations* of the membranes, and even of the substance of the heart, if they come early under treatment, will often terminate favourably; yet they ought, nevertheless, to be viewed as very dangerous maladies, as respects both the organic lesions they may cause, and the contingency of an immediate or sudden dissolution. — *c.* Most of the *organic lesions* of the organ are incurable; and yet the patient may live many years, when judiciously managed. — Of this kind are, induration of the valves, narrowing of the orifices, chronic pericarditis, hypertrophy, &c. — The unceasing functions of the heart, and their extreme importance to the economy, however, render diseases of it more dangerous than those of almost any other organ. But the advances that have been recently made in their diagnosis, have given greater precision to the treatment, and have consequently afforded a greater degree of success, than formerly.

34. viii. *The Treatment of Cardiac Affections.* — *A.* The *nervous affections* of the heart, especially those associated with disorder of the digestive and assimilative organs, or characterised by irregular or excessive action, have been too generally, and most injuriously treated, by vascular depletions and purgatives. I have seen even the complication of palpitation with chlorosis treated by depletions, and a complete state of anæmia result. In cases of this kind, a judicious selection of tonics, chalybeates, anodynes, and stomachic aperients, appropriately to the peculiarities of each, aided by light, nutritious diet, by gentle exercise in an open dry air, and sometimes by tonic and alterative mineral waters, will generally remove the complaint.

35. *B.* The *inflammatory diseases* of the heart require more or less copious and repeated depletions, — in the acute stage, the most decided adoption of them, as well as of other antiphlogistic means. — M. Bouillaud has strongly insisted upon the propriety of prescribing repeated bloodlettings; but, although the depletions he recommends are considered large, in France, they are not larger than those usually directed in this country for the same diseases. The exhibition of calomel and opium, or of calomel, antimony, and opium, in repeated doses, to promote the resolution of the inflammatory action, or to prevent it from passing into the chronic state or from terminating in effusion, or to limit the effusion of lymph, or to prevent the organisation of what may have been effused, and promote its absorption, is the next most important means, and should always follow immediately after a decided vascular depletion, in the manner described in the article Blood (§ 64—68.). — This practice, somewhat modified from that adopted by British medical practitioners in warm climates, was first brought into use in this country, by Dr. Hamilton, of Lynn Regis (*Medical Comment, &c.* vol. ix. p. 191. Lond. 1785.). His paper on this subject — the most valuable in modern medical literature — contains all the modifications that have been attempted in this practice, by Dr. Armstrong and other more recent writers, with the view of appearing original. It has been erroneously stated, by several who have adopted this treatment, that Dr. Hamilton always prescribed these medicines until the gums were affected by them; and it has been claimed as a point of originality, that they have employed the same means so as not to produce, or short of producing, this effect. In some complaints, however, and even in some of those under consideration, this effect is necessary to the successful operation of these substances. That Dr. Hamilton, however, thought it unnecessary to employ them, in certain diseases, as rheumatism, &c., so as to affect the mouth, is shown by his remarks respecting their operation (*Opus citat.* p. 200.). He there states, that when they act upon the skin, or bowels, relief will accrue from them without the mouth becoming affected; and that, when the skin is dry, hot, or contracted, emetic tartar should be added to the calomel and opium, in order to determine to this surface.

36. When inflammations of the heart come under treatment at a more advanced stage, or when they have assumed a more chronic form, vascular depletions must be prescribed with greater caution, and the calomel and opium should be given, until either the gums become affected or a slight ptyalism be produced. If the action of the heart be irregular, or excited, a small quantity of camphor may be added to each dose of these medicines; and, if the pulse be hard and regular, a repetition of the bloodletting, and a combination of James's powder or of tartar emetic, or of ipecacuanha, with the calomel and opium, will act beneficially, both upon the circulation, and upon the emunctories. The bowels should be kept freely open, and the action of aperients be promoted by enemata.

37. Although it is necessary to have recourse

to copious depletions in the acute or early stage of inflammations of the heart, yet their effects should be carefully watched; and they ought to be still more cautiously employed in chronic or advanced cases; for there are very few inflammatory diseases, in which they may prove more beneficial, than in these, if they be resorted to at the proper time, and in sufficient quantity; or in which they may be more injurious, if too long delayed, or too sparingly employed, or carried too far. When prescribed in a timid manner, and if a decided use of calomel and opium, sometimes with antimony, colchicum, or other adjuvants, be not adopted, an acute inflammation, which would otherwise have entirely subsided, either passes into a chronic state, or gives rise to organic changes embittering the shortened period of future existence. Yet, whilst thus prompted to decision, it must never be overlooked, that in most cases of inflammation affecting this viscus, the organic nervous energy is more or less impaired or irregularly determined; and that the most decisive measures should, therefore, be directed with the utmost circumspection. The other means which may be brought in aid of those already noticed, are comparatively of so little importance, and require to be so varied according to the forms and stages of the disease, that no mention need be made of them until the specific affections of the organ come under consideration.

38. *C.* The *organic lesions* of the heart require a much more prudent recourse to depletions than the diseases just dismissed, inasmuch as the nervous influence, especially that actuating the organ, is much more impaired, in the former maladies than in the latter. In cases of dilatation of one or more of the cavities, even a moderate depletion may be followed by a fatal result; and when there is hypertrophy, the heart requires all the energy it possesses to overcome the obstacle in the way of the circulation. The small but repeated depletions, and the antiphlogistic regimen, recommended by VALSALVA and ALBERTINI, and so generally adopted in organic diseases of the heart, may be carried too far, as CORVISART has judiciously shown. They may be even most injurious. There are few means which are universally, or even generally, applicable to these lesions, excepting mental and physical quietude, and attention to the digestive and excreting functions. Vital energy seldom admits, in them, of being lowered; and whatever acts in this manner, should be employed with discrimination, or appropriately to those states which seem specially to require it. — In them, also, moral training, attention to diet, living in an equable temperament, and in a healthy and airy situation, a gently open state of the bowels, and a due secretion of bile, and the careful avoidance of whatever excites or aggravates the disorder of the heart, are amongst the most generally applicable means of treatment. Numerous other measures may be employed, but they are applicable only to particular lesions, and therefore will be mentioned where the treatment of these lesions is particularly discussed.

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III. OF NERVOUS OR FUNCTIONAL AFFECTIONS OF THE HEART.

i. OF IMPAIRED OR IRREGULAR ACTION. — CLASSIF. I. CLASS, III. ORDER (*Author*).

39. DEFIN. — *The action of the heart more or less weakened or irregular, with faintness, or depression, and often with disorder of the digestive organs.*

40. The functions of the heart may be imperfectly performed in two principal ways; — 1st. They may be simply weakened, but in every grade, until they become extinct, and yet structural lesion may not be detected to account for

the circumstance. — 2d. They may be impaired or enfeebled, with more or less irregularity of the contractions, and yet no organic change may exist; the impaired and irregular action occurring only temporarily. One of the most familiar forms in which this affection presents itself, is that of fainting or syncope. But in this the heart is not always primarily affected. — *A. Simply Enfeebled Action of the Heart*, depending upon deficient energy of the cardiac ganglia, may proceed from whatever depresses the organic nervous influence, or from inanition or anæmia. It may also be sympathetic, or the result of a derivation of the vital influence to different organs, as during certain periods of impregnation. The causes, pathological states, the diagnosis, and treatment of this affection, are fully described under the article FAINTING.

41. *B. Enfeebled and Irregular Action of the Heart*, is a common affection in its slighter grades. — The pulsations may be unequal, in frequency and power, or they may be intermittent, reiterated, or fluttering. This state of action, although attending various dangerous diseases of the organ, may be entirely nervous, or connected with depressed organic nervous power, and enfeebled function of the stomach and liver. In this latter case especially, it is often induced by flatulence, particularly when the flatus rises into the œsophagus and is retained there by spasm of the canal. It also may proceed from mental emotions, or from whatever overloads the cavities of the heart, or interrupts the return of blood from the lungs, or causes congestion of the left auricle and pulmonary veins.

42. *C. Treatment.* — Unless it is attended with a sense of sinking, or oppression, or anxiety, at the præcordia, this affection requires only attention to the digestive, assimilating, and excreting functions, and to diet and regimen. But if these symptoms are present, restoratives, especially camphor, the preparations of ammonia, the æthers, carminatives, and tonics conjoined with either of these, will often be necessary. Much advantage will also result from taking a digestive pill (F. 507. 562.) at dinner or bed-time. A small or moderate bloodletting is not infrequently prescribed in cases of this kind, with the view of removing congestion of the heart or large vessels. When the patient is plethoric, or when the irregularity is consequent upon the suppression of an accustomed evacuation, or of congestion of the portal system, this practice is judicious, if cautiously resorted to. In the latter circumstances, the application of a few leeches around the anus will often be of service. The bowels ought also to be freely acted upon by deobstruent and mild purgatives. In these cases, although there may be vascular plethora, or local congestion, nervous or vital power is at the same time more or less impaired, and therefore the means of restoration just mentioned should also be employed. The treatment about to be advised for palpitations (§ 50.) is often also appropriate in this affection. — When enfeebled and impaired action of the heart occurs in gouty persons, or appears as *misplaced* or *retrocedent* GOUT, the means advised under such circumstances in that article (§ 83. 89.) should be prescribed.

ii. EXCITED ACTION OF THE HEART. — SYN. Καρδιωγμὸς, Hippocrates, Galen; *Cordis Palpitatio, seu Pulsatio, Palmus* (παλμὸς, a beating or palpitation); *Cardiopalmus*, Swediaur; *Tremor Cordis, Palpitatio*, Cullen, et Auct. var.; *Palmus Cordis*, Young; *Clonus Palpitatio*, M. Good; *Palpitation, Palpitation du Cœur*, Fr.; *Das Herzklopfen*, Germ.; *Palpitazione*, Ital.; *Palpitation, Palpitation of the Heart.*

CLASSIF. — 2. *Class*, 3. *Order* (*Cullen*). 4. *Class*, 3. *Order* (*Good*). II. CLASS, I. ORDER (*Author*).

43. DEFIN. — *Strong, frequent, or tumultuous action, with an increase of the impulse and natural sounds of the heart, so as to be sensible, and often distressing, to the patient, without appreciable lesion of the structure of the organ.*

44. *A. Palpitations* are either *nervous* or *functional*, or *symptomatic* of some one of the more serious diseases of the heart, hereafter to be considered. The former only of these fall under discussion at this place. — Nervous palpitations may be either *primary*, and depending upon excitement of the nerves of the heart, without manifest disorder of other viscera, as in attacks induced by moral emotions; or *sympathetic* of affections of remote or related organs. They are often sudden in their accessions, but more rarely so in their subsidence. The sounds of the organ are generally increased during their continuance; and the first sound is further augmented by the impulse or shock against the ribs, occasioning a distinct knock, which may be sometimes heard at a short distance from the patient. They are also occasionally attended by a slight bellows sound, which always disappears when the heart resumes its natural action. Nervous palpitations are often accompanied with uneasiness and slight anxiety at the præcordia; and sometimes, also, with a sense of sinking, or faintness, with which they not infrequently alternate.

45. *B.* The *Causes* differ much in their natures, or modes of operation; and modify accordingly the characters of this affection. — The nervous and irritable temperaments, early age, debility, in whatever way induced, venereal excesses, and mental exertion, remarkably *predispose* to this disorder. — The *exciting causes* are — 1st. The more active mental emotions, as fright, anger, joy, &c.; also sadness, anxiety, melancholy, nostalgia, longings after objects of affection, excitements of the imagination, &c.; — 2d. The abuse of spirituous liquors, and muscular exertions, or whatever accelerates the return of blood to the right side of the heart, and over-distends the large veins and auricles; — 3d. Excessive or debilitating discharges; the abstraction of a natural or necessary stimulus; sexual excesses, or manustupratio; this last being the most common and influential of the exciting causes; — 4th. Inanition, from deprivation of the necessary nourishment, or from impaired assimilation, or from excessive waste of the secretions, or circulating fluids, as in the palpitations associated with chlorosis and anæmia, or consequent upon depletions; — 5th. Pressure on the large vessels, occasioned by strait lacing, by pregnancy, by abdominal tumours, effusion, &c.; — 6th. Enfeebled action of the digestive functions, particularly when attended by flatulency and torpor of the liver, or constipation of the bowels; — 7th. The irritation of worms in the intestinal canal, in connection with debility, &c.; — 8th. Hysteria in

several of its Protæan forms, especially when the uterine functions are disordered, and the catamenia either excessive or obstructed; — 9th. Irritation of the spinal chord, or of its nerves, or excitement of the uterus or ovaria acting upon the heart, either directly by the great sympathetic nervous system, or mediately through the spinal chord; the irritation propagated to this latter being reflected from it along the branches communicating between it and the cardiac and other sympathetic ganglia.

46. Although these may be considered the principal causes, yet others sometimes produce functional palpitation; especially several *antecedent disorders*, and organic lesions, as — *a*. Adynamic and nervous fevers; — *b*. General plethora by overloading the auricles and large vessels; — *c*. Irregular, or misplaced gout, occasioning irritation of the cardiac nerves, or congestion of the large vessels or cavities of the viscus; — *d*. Obesity, particularly in connection with plethora; — *e*. Obstructed circulation through the lungs, owing to diseases of their structure, or to effusions of fluid pressing upon them, or other causes preventing their expansion; — *f*. Enlargements of the abdominal or pelvic viscera, or effusions into the peritoneum, preventing the easy descent of the diaphragm, or pressing upon that part connected with the pericardium, as enlarged or engorged liver or spleen, pregnancy, ascites, &c.

47. *D. Course and Duration of Nervous Palpitation.* — *a*. This affection varies somewhat according to the cause which produced it. — *α*. When it proceeds from *mental emotions*, it is often violent, but of very short duration. — *β*. When it arises from *manustupratio*, it is not so excessive, but it is more prolonged; or remittent or recurrent. — *γ*. Palpitations *sympathetic of dyspepsia* are seldom severe, unless in persons of the nervous or irritable temperaments, nor of long duration; but they are readily excited, particularly by a full meal, or by indigestible, or flatulent, or fluid food. In such cases the action of the heart is irregular, as well as excessive, tumultuous or fluttering, and attended by anxiety, sometimes by pain, and by accelerated breathing or dyspnœa. — *δ*. When this affection proceeds from *misplaced*, or *retrocedent gout*, it is generally severe; more, however, from the attendant sensations, than from the violence of the palpitations. The action of the heart is excessive, most irregular, or tumultuous, and attended by distressing anxiety, or sense of sinking or of anguish at the præcordia often extending to the epigastrium, and by extreme restlessness, and a feeling of impending dissolution. — *ε*. Palpitation is very often *an attendant of hysteria*; and in this case is excited or aggravated by the globus hystericus, or by the borborygmi or intestinal flatulence, characterising the latter affection. A feeling of strangulation frequently accompanies this form of palpitation; and, in two or three instances, I have observed an almost sudden swelling of the thyroid gland to take place, this part returning to, or nearly to, its former state very soon after the attack. In more than one of these cases, there was evidence of co-existent irritation or excitement of the uterine organs. Hysterical palpitation sometimes alternates with faintness, or is connected with excessive menstruation. It occasionally also follows abortions, floodings, &c. — *b*. The *Duration* of palpitation is most indefinite. It may continue only a few minutes, or many days. It may be remittent, intermittent, or even periodic; but its course is more generally irregular.

48. *E. Diagnosis.* — It is often easy to distinguish nervous palpitation from that symptomatic of organic lesion; but quite as often the diagnosis is very difficult. That it should be made with accuracy is most important, as respects both the treatment, and the immediate happiness of the patient; for many distress themselves and aggravate their complaints with fears of an organic malady, whilst they are affected only with functional disorder. When nervous palpitations are prolonged, remittent, or return frequently and are severe, the diagnosis is generally difficult: if attempted during their continuance, it is still more so; and if deferred until the period of intermission, it is often not much less difficult; for some organic lesions occasionally present periods, in which the symptoms are remarkably ameliorated. Yet an attentive examination of the whole chest by percussion, auscultation, by the eye, and by the touch, will generally determine the question with great accuracy, and show that, in this affection, the heart is not enlarged, and that the blood circulates freely through its various orifices. The extended dulness on percussion, the morbid or adventitious sounds, the more or less constant dyspnœa, the venous congestions, the bloated state of the countenance, the dropsical effusions, &c., sufficiently mark organic lesion of this organ, especially if it have become far advanced. Sometimes, however, great nervous sensibility, or an hysterical affection, may be attendant upon some degree of alteration of structure; the palpitation recurring in severe paroxysms after slight mental emotions, or other causes affecting the nervous system, and leaving the patient comparatively easy, and with few precise or well-marked symptoms in the intervals. This is not infrequently observed in persons who have been subjects of inflammation of one or more of the constituent tissues of the heart, that has left behind it slight structural change in connection with an irritable state of the organ, and great susceptibility of the nervous system.

49. In addition to these considerations, the following circumstances may be adduced as distinctive of a functional disorder: — 1st. The general prevalence of nervous symptoms, and the recurrence of the attack from causes acting on the nervous systems; — 2d. The return of the affection when the patient is quiet, and the relief following gentle or moderate exercise in the open air, and the means used to improve the digestive functions and to restore the nervous energy; — 3d. The prolonged and complete intermissions during an improved state of the general health, and the exacerbations consequent upon whatever depresses or exhausts organic nervous power, especially upon the operation of any of the causes enumerated above (§ 45, 46.); — and, 4th. The absence of the physical signs characterising any of the inflammatory and structural diseases about to be considered.

50. *F. Treatment.* — *a*. The means prescribed for this affection should have a very strict reference to the causes which produced it, and especially to the pathological state of which it is

sympathetic. If it be independent of vascular plethora, or of disease of remote organs — if it be primary and the consequence of enfeebled or exhausted nervous influence, or of *inanition*, *anæmia*, *chlorosis*, &c.— chalybeates, tonics, and restoratives, regular exercise in the open air, change of air to the seaside, the use of the tepid or cold bath, sea-bathing, light and nutritious food, an infusion of green tea*, early hours, and healthy employment, the bowels being regulated, or preserved open by an occasional dose of a mild stomachic purgative, or by a tonic, carminative and purgative conjoined, are the most appropriate remedies. — For persons who are of an irritable or nervous temperament, or who cannot bear the immediate use of chalybeates, the stomachic bitters, or vegetable tonics, with the alkaline subcarbonates, or the preparations of ammonia, will be most serviceable; and afterwards quinine with sulphuric acid, and æther, or with camphor; or the decoction of bark with the hydrochloric acid and chloric æther; and, lastly, the metallic salts, especially the sulphate of zinc, or of iron, or the nitrate of silver; may be prescribed. I have for many years employed the nitrate of silver triturated with the extract of hyoscyamus with great benefit in this affection, as well as the sulphate of zinc similarly combined. The various strengthening mineral waters, and amusements in the open air, will also prove beneficial.

51. *b*. When palpitation proceeds from *masturbation* — a more prevalent vice than is generally supposed — the preparations of iron, with camphor; the tincture of the muriate of iron; the tonic infusions or decoctions, with the alkaline subcarbonates, with the solution of potash, or with Brandish's alkaline solution; soda water or Seltzer water, as a common beverage; early rising, and regular exercise in the open air; will be found the most useful means of cure; but they will all fail if the cause still continues. — *c*. Palpitation in connection with *plethora* requires a moderate bloodletting, which may be repeated in some instances; a restricted and chiefly farinaceous diet, and the daily use of stomachic or mild purgatives, early rising, and regular exercise. This form of the affection is not uncommon during the early months of *pregnancy*, and may be treated by the means just named. — *d*. When this affection is symptomatic of *dyspepsia*, the treatment must depend upon the state of the vascular system. If this system be plethoric, then the remedies now specified should be prescribed, the excreting functions freely acted upon, and the biliary secretions promoted. (See Indigestion.) — *e*. The palpitations arising from *gout*, are generally relieved by camphor conjoined with acetate or muriate of morphia, or with hyoscyamus, and by a copious action of the bowels procured by warm stomachic purgatives, with which magnesia or the alkaline subcarbonates may be conjoined. In this, as well as in the dyspeptic form of palpitation, I have seen much benefit accrue from the hydrocyanic acid, given three times a day, in a tonic infusion, an absorbent and carminative tincture being added; but the bowels should previously be well evacuated. (See art. Gout, §86.)

52. *f*. *Hysterical palpitations* require, according to the degree of plethora, or of inanition, nearly similar means to those already mentioned, and attention to the uterine functions. The bowels should be kept open by cooling aperients; and, if there be much debility, tonic infusions, with the muriate of ammonia, or nitrate of potash, or subcarbonate of soda; the infusion of valerian, with the fœtid spirit of ammonia, &c.; and other remedies enumerated in the article Hysteria; may be directed, according to the pathological peculiarities of the case. The existence of pain or tenderness in any part of the spinal column should also be ascertained in this form of the affection; and, if either be present, the means calculated to remove it ought to be resorted to. — *g*. When palpitation depends upon *chlorosis* or *anæmia*, a combination of the sulphate of iron with aloes, and an aromatic powder in the form of pills, is generally of service. I have seen great benefit derived from one or two grains of the sulphate of iron, with three of the aloes and myrrh pill, and an equal quantity of the extract of conium, given twice or thrice daily. The formulæ, also, in the *Appendix* (F. 519—525.), will prove equally serviceable. — *h*. In the palpitation connected with *chronic bronchitis*, or with *asthma*, an infusion or decoction of senega, with aromatics and anodynes; camphor, assafœtida, and other remedies advised in these articles; are indicated. — *i*. When this affection is caused by *intestinal worms*, or by *enlargement* of any of the *abdominal* or *pelvic viscera*, or by *ascites*, or by *effusion* into the *pleural cavities*, the treatment should be chiefly directed to the removal of these maladies.

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* In the summer of 1820, I was requested by a practitioner to see the daughter of a clergyman, residing in Westminster, labouring under most violent nervous palpitations, which had resisted the means advised by several physicians who had been consulted. She was in bed; and the impulse of the heart moved the bedclothes, so that the pulse could be counted by the eye at the furthest part of the room; and the knock of the heart against the ribs could be heard at the distance of some feet. She was thin, delicate, and highly nervous. Finding that the usual remedies for nervous palpitation had been prescribed without any relief, I suggested that a strong infusion of *green tea* should be given three or four times a day, and continued for a few days. Relief immediately followed, and perfect recovery in two or three days.

t. i. n. 8. (*Nitre with tonics.*) — *Laennec*, Auscult. Médiate t. ii. p. 227. Paris, 1829. — *A. Portal*, Mém. sur la Nature et Traitement de plusieurs Maladies, t. iv. p. 173. Paris, 1819. — *Merat*, in Dict. des Sciences Médicales, t. xxxix. p. 134. — *J. Johnson's* Med.-Chirurg. Rev. vol. iv. p. 370., vol. v. p. 277. — *Andral*, Dict. de Médecine, t. xvi. 8vo. Paris, 1826. — *J. Frank*, Praxeos Medicæ Universæ Præcepta, vol. ii. pars ii. sect. ii. p. 370. — *J. Hope*, Cyclop. of Pract. Med. vol. iv. p. 232. — *J. Bouillaud*, Traité Clinique sur les Mal. du Cœur, t. ii. p. 486.

iii. Painful or Neuralgic Affections of the Heart. — Classif. II. Class, I. Order (*Author*).

53. Charact. — *Sudden attacks of anguishing pain in the cardiac region, returning at intervals; the actions and sounds of the heart, and respiration, being but little affected.*

54. In the same category with the disorders just considered may be arranged those painful affections which have been considered as neuralgia of the heart. They might be viewed as modifications of Angina Pectoris, and arranged with it, if there were sufficient evidence to prove that they are actually seated in the nerves of this organ. But, as Bouillaud observes, although the functions of the heart may be disordered in connection with them, the nerves of the adjoining viscera and structures are probably as much affected as those of the heart. A case of this complaint has been described by Dr. Elliotson, and is altogether similar to some that have occurred in my practice. Indeed, *neuralgia* of the cardiac and communicating nerves, or affections intermediate between it and *angina pectoris*, are by no means rare. A case of this affection came under my care in 1821; and since then I have treated six similar cases: two in females between the ages of twenty-five and thirty, three in gentlemen somewhat upwards of fifty, and a sixth in a physician of about thirty-five years of age.

55. *A. Diagnosis.* — According to the phenomena observed in these cases, this complaint is characterised as follows: — A most acute, lancinating, and anguishing pain is felt to the left of the sternum, darting through the region of the heart, often from under the left nipple backwards to the spine or left shoulder-blade. Sometimes it is confined to this organ; and occasionally it extends to the left brachial plexus, and up the left side of the neck, or left arm, or to other parts in the vicinity of the heart. This complaint is generally intermittent, or remittent, or even periodic in its character; the paroxysms are sudden or almost instantaneous in their accession; and their duration is very variable. They leave the patient intervals of comparative ease, when the pain is dull or aching, and confined to the region of the heart. They return at various intervals; sometimes once or twice in the day, and occasionally not for several days. They are attended by the utmost agony and distress. The actions of the heart are somewhat accelerated during the fit, and sometimes more or less irregular or turbulent; but they are also in other instances nearly natural. There is no morbid sound, beyond a slight bellows-sound in a few cases, heard on auscultation; and the breathing is tranquil. The paroxysm may take place at any period, and when the patient is perfectly quiet, mentally and physically, and without the occurrence of any cause sufficient to account for the seizure. This affection does not appear to be aggravated, or its attack to be favoured, by exercise, or by motion or position; but, on the contrary, it seems to be benefited by gentle exercise in the open air. Debility and loss of flesh generally are induced by the excessive suffering; but the appetite is not materially impaired. The powers of digestion are, however, weakened, and the bowels are more or less sluggish. — This complaint is generally of long *duration*. The shortest period in my cases was six or seven months; and in one, where the intervals between the attacks were very considerable, it was as many years.

56. *B. Causes.* — Of the six cases above referred to, two were females. They were both unmarried; but the catamenia were perfectly regular; and neither of them had ever complained of any hysterical symptom, or had experienced pain in the spine. Of the four males, the two most advanced in life had formerly had gout; and in one of them, who was under the care of Dr. Roots and myself, the cardiac neuralgia was induced by grief. The other two were medical practitioners: one of them had been engaged in a laborious practice in the country; the other had experienced family contrarieties and disappointments, and was endowed with the utmost susceptibility and irritability. — The recurrence of the attack seems to be favoured by cold, especially by cold east winds; and there is reason to believe that malaria is concerned in causing it. In a violent case, recorded by M. Andral, no trace of organic lesion was observed on dissection.

57. *C. Treatment.* — The means of cure in this affection are not materially different from those advised for Angina Pectoris, to which it is an intimately allied affection. As in that complaint, so in this, and in Palpitations (§ 50.), the indications are — 1st. *To shorten the attack*; — 2d. *To prevent the recurrence of it.* — *a.* The remedies I have found most efficacious in fulfilling the *first intention*, are — *camphor* in large doses with *opium*, or acetate of morphia; the *prussic acid*, with camphor, or ammonia, or other stimulating antispasmodics, or warm carminatives and tonics; a full dose of *calomel*, with camphor, *capsicum*, and opium, or the muriate of morphia; the preparations of *colchicum* conjoined with ammonia, camphor, the subcarbonate of soda, &c.; a *mustard poultice* applied as hot as it can be endured over the epigastric region; and a plaster, consisting chiefly of extract of *belladonna* and camphor, placed over the præcordia. I have tried various narcotics, besides these just named; but less certain advantage has been derived from them than from those. The extract or tincture of *aconitum*, or of *stramonium*; or the powdered root or leaves, or the extract, of *belladonna*; are, however, often of service, especially when the medicines just mentioned have failed.

58. *b.* The *second intention* has been best answered by purgatives, by mild and chiefly farinaceous food, by abstinence from stimulating liquors, by tonics conjoined with absorbents and stimulants, and by external drains or derivatives long persisted in. The *carbonate of iron*, in large doses, the bowels being kept freely open, has been sometimes of service. — Dr. Elliotson found benefit from it in one instance; but it has failed in other cases; and equal advantage has been derived from a combination of *sulphate of quinine*, *camphor*, and as much puri-

fied extract of *aloes* as acted freely on the bowels. In one of the female cases alluded to, the *nitrate of silver*, given with a narcotic extract, was extremely serviceable. In the other, pills, containing as much *croton oil* as procured at least three or four stools daily, were regularly continued for a considerable time, and a *large issue* was kept long discharging. Complete recovery took place in both instances. In one case, change of air, travelling, attention to diet, and *issues* in the side, effected a cure, the patient being a physician of great learning and extensive medical knowledge. In another case, the symptoms were aggravated by depressants and abstinence; and recovery took place during a recourse to *tonics* conjoined with *anodynes*; to a generous and light diet — the patient being allowed from four to six glasses of old wine, or even more, daily; and to change of air, and the amusements and distractions of watering-places. In one instance, great benefit appeared to follow the persevering use of *croton oil* as an external derivative; an eruption over the epigastrium having been kept long out by its means. In the case of a medical practitioner from Devonshire, who very recently consulted me, all these, as well as other means, altogether failed. At last, an ointment containing *aconitine* was directed to be rubbed over the sternum; but of the effect of this I am yet ignorant. In another instance, no benefit followed the application of an ointment containing *veratria*.

59. Besides the substances already mentioned, I have tried many others. — *Digitalis* has been of no service. Some benefit, however, has followed the internal use of *turpentine* given in drachm doses until it affected the urinary organs; and from the *hydriodate of potash*, or *hydriodate of iron*, conjoined with narcotics. — I tried *créosote* in one case without any advantage. I think that the disease may wear itself out, in some instances, without being much relieved by medicine, if attention be paid to diet and regimen, and to the state of the stomach and bowels, and if the energies of life be supported or promoted by suitable means. — At present, I am attending a gentleman who has been for many years afflicted with this complaint, the paroxysms of which, however, come on after considerable intervals. He was formerly subject to gout, which I have attempted to excite in the lower extremities without avail. He has consulted many physicians in London and on the Continent, and has even given homœopathy a lengthened trial. On no occasion had he experienced any material relief. I was requested to see him six or seven years ago; and have since continued to prescribe for him occasionally, excepting whilst he had recourse to means prescribed by Dr. Turnbull, from which he derived no benefit. The attacks are shortened and relieved by the medicines mentioned above (§ 57.); but they still recur, although not so frequently as before; attention to diet, an open state of the bowels, and gentle exercise in the open air, being found most efficacious in deferring their visitations.

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IV. Inflammations of the Heart and Pericardium.

— Syn. *Carditis*, Auct.; *C. Spontanea*, Sauvages; *Cauma Carditis*, Young; *Empresma Carditis*, Good.

Classif. — 1. *Class*, Febrile Diseases; 2. *Order*, Inflammations (*Cullen*). 3. *Class*, Diseases of the Sanguineous Function; 2. *Order*, Inflammations (*Good*). III. Class, I. Order (*Author*, in *Preface*).

60. Defin. — *Continued pain or anxiety in the region of the heart, palpitations, a tendency to syncope or faintness, dyspnœa, acceleration and irregularity of the pulse, with symptomatic inflammatory fever.*

61. Inflammations of the heart were first described by Rondelet, and afterwards by Salius Diversus and Forestus. More recently, they have received attention from many systematic writers; but, until the appearance of the works of Burns, Corvisart, Kreysig, Testa, Hildenbrand, and Laennec, their pathology and treatment were deficient in precision and accuracy. J. P. Frank first directed attention to inflammation of the *endocardium*, or internal membrane of the heart, especially in connection with inflammation of the internal surface of the bloodvessels. — Hildenbrand considered that inflammation might affect either the *pericardium* reflected over the heart, or the *substance of the organ*, or the *membrane covering the valves and internal surface* of the compartments; but that it was seldom confined to any one of these situations. — Of still more recent writers, some have entirely overlooked inflammation of the internal membrane, whilst others have very properly insisted upon its frequency and importance, in its various grades, and in respect of its diversified results. It is somewhat surprising that Laennec and Hope should have neglected this form of carditis, after attention had been directed to it by Frank, Hildenbrand, and Kreysig. M. Bouillaud has considered it much more fully than any former writer; but he is mistaken in thinking that he is the earliest writer upon it; for, in addition to the names just mentioned, Bertin, Barbier, Littré, P. M. Latham, Elliotson, and Watson, wrote upon it before the appearance of his excellent work. Hildenbrand expressly refers the lesions of the internal surface of the organ, and of the valves, to inflammation; these lesions having a more or less strict reference to the intensity and duration of the inflammatory action. (*Institutiones*, t. iii. p. 263.) Since 1824, I have described *internal carditis* in my lectures, and have pointed out the alterations of structure induced by it; and, in treating of inflammations and organic changes of the heart, I have always described it first, considering it as one of the most frequent forms of carditis, and, in its various grades, as the cause of most of the alterations observed in the structure of the organ. On the present occasion, I shall consider, *firstly*, *internal carditis*, or endocarditis; *secondly*, *extertternal carditis*, or pericarditis; and, *thirdly*, *carditis proper*, or muscular carditis, with the lesions which are more immediately induced by them, individually and conjointly. Although it is necessary thus separately to discuss these diseases,

inasmuch as each may exist in a primary and distinct form; yet, as this is comparatively rare, I shall also consider their associations with each other, and with other maladies.

i. INFLAMMATION OF THE ENDOCARDIUM. — SYN. *Carditis Interna*, Author; *Endocarditis*, Barbier, Littré, Bouillaud; *Inflammatio Superficiei internæ Cordis*, Hildenbrand; *Internal Carditis*, *Inflam. of the Internal Membrane of the Heart.*

62. CHARACT. — *Oppression and anxiety at the Præcordia, with frequent faintnesses; dyspnœa; increased action, remarkable acceleration, and irregularity of the heart; and morbid sounds heard on auscultation; the pulse being weak, small, irregular, or indistinct.*

63. *A. History.* — The serous membrane lining the cavities and valves of the heart is occasionally found intensely red in one or both sides of the organ. This change has even extended to the aorta and pulmonary artery. — Since it was first noticed by J. P. FRANK, it has attracted much attention. The redness cannot be removed by washing, and hardly even by maceration. It has been ascribed to the imbibition of the colouring matter of the blood; but frequently no blood is found in contact with the coloured part. It evidently does not arise from congestion of the cavities of the heart previously to death, because it has been observed where no such occurrence has taken place further than is always attendant upon dissolution. It certainly is not owing to decomposition, either incipient or advanced, as no signs of this change have been detected in connection with it. That it is essentially dependent upon inflammation, is shown by its being very often attended — 1st, by slight thickening and softening of the membrane itself; 2d, by that change in the connecting cellular tissue which permits this membrane to be more readily detached from the adjoining textures than in health; and, 3d, by the presence of the usual products of inflammation affecting serous surfaces. The circumstance of these products being frequently not found on the reddened or injected internal surface of this organ, is readily explained by the fact, that the lymph, the usual product of inflammation of serous membranes, being effused in a fluid state, is commonly carried away by the current of the circulation before it can coagulate on the inflamed surface. — Besides, *internal carditis* very often takes place in connection with that state of constitutional power which JOHN HUNTER very ably proved to be incapable of forming coagulable lymph. But this disease is not infrequently met with in a form which does not admit of doubt; and to that, more especially, I have now to direct attention; its more disputed states also coming under consideration in the sequel.

64. KREYSIG (*Ueber die Krankh. des Herzens*, 2d th. p. 125.) was the first to give a detailed *description* of *internal carditis*; but M. BOUILLAUD has very recently entered upon the subject much more fully than any of his predecessors. The frequency of the disease, especially in connection with articular rheumatism, will enable the practitioner to investigate its nature, and the phenomena it occasions in relation to the structural lesions which have been produced. This has been ably done by M. BOUILLAUD, who, although he is not the first, is certainly the best, writer on the subject. — Since 1820, my attention has been directed to internal carditis, in consequence of having then met with a remarkable case of it. (See *Lond. Med. Repos.* vol. xv. p. 26. 1821.) In 1821, I was requested to see another case, which terminated fatally much more rapidly than the former. To both these I was called in consultation with other practitioners; and in both, as well as in a third that occurred the following year, *post mortem* examinations were made. I have since frequently observed this form of carditis; and my experience warrants the assertion, that a large proportion of the more obscure — or what were formerly considered the more obscure — affections of children, particularly those occurring in connection with affections of the joints, are either internal carditis, or this complaint associated with pericarditis.

65. *a. The alterations of the internal membrane of the heart, caused by inflammation of it*, vary with the intensity and duration of the morbid action. — (*a*) *At an early stage* — 1. *Redness* is one of the most common appearances. It varies from a scarlet tint to a reddish brown or violet hue; and may be limited to the valves, or extended to all the cavities, or even to the large vessels. The inflammatory nature of this redness has been disputed; but when it is attended by one or more of the following lesions, its nature then admits of no doubt. — 2. *Thickening* of the internal membrane, or endocardium, is a common attendant on inflammatory redness, when it has continued a few days, especially of that part reflected over the valves. — 3. *Softening* also sometimes is observed in this stage, but most frequently in the next; this change generally extending to the connecting cellular tissue. — 4. *Ulceration* is met with only in rare cases at this period; but instances of its occurrence are recorded by BOUILLAUD and others. — 5. *A puriform* or *albuminous exudation* also takes place; but rarely in such a manner as will admit of its demonstration. So great is the force and rapidity of the current of blood through the compartments of the heart, and so rapid the motions of their parietes, that the products of inflammation of their internal surface are swept away and mixed in the circulating mass. Nevertheless, portions of these secretions are occasionally found after acute endocarditis. Puriform matter has sometimes been seen inclosed in a coagulum, or concealed in the meshes of the muscular columns. Coagulated or albuminous lymph has been found in similar situations; but more frequently adherent to the valves, or to their margins, or tendons. Occasionally it appears like granulations on these parts. — 6. *Gangrene* has been supposed hardly ever to occur from carditis; but M. BOUILLAUD considers that the appearances observed in some of his cases warrant the inference that it may take place, although rarely in consequence of acute endocarditis; and I believe that it will supervene only when internal carditis attacks a cachectic habit of body, or when there is a septic tendency induced in the system by a depraved state of the circulating fluids and by impaired vital power. — 7. The *blood* is more or less affected by acute endocarditis. When the disease attacks a person whose blood has not been already materially vitiated, or whose

soft solids have not been materially affected, then it occasions a greater or less disposition of this fluid to coagulate, and gives rise to fibrinous concretions resembling those found in the bloodvessels after inflammations of their internal surfaces. These concretions, when formed in the heart, are colourless, elastic, glutinous, and adherent to the internal surfaces of the cavities, or interlaced between the fleshy columns and tendons of the valves, and resemble the buffy coat of the blood. They are manifestly produced by the lymph exuded by the inflamed internal surface of the organ, which, towards the close of life, forms the nucleus around which the fibrinous portions of the blood collect and concrete. — If, however, internal carditis occurs when the blood is already vitiated, and vital power is either much impaired or deteriorated, the fluid effused from the inflamed part will be incapable of coagulating itself, or of causing the coagulation of the blood — will be of a watery or sanious kind — and will instantly mix with the mass of blood, and further vitiate it; death soon taking place, with all the symptoms of adynamic or putro-adynamic fever.

66. *b.* The *second stage*, or the period intervening between the fifteenth and thirtieth day of the disease, is attended by other alterations. — 1. The inflamed membrane is more *thickened*, this change often extending to the connecting cellular tissue, and even to the fibrous textures, especially of the valves. — 2. The albuminous or fibrous exudations now pass from the amorphous to the organised state, and assume the appearances of *excrescences, vegetations, granulations, cellulo-fibrinous adhesions*, and of *sero-albuminous false membranes*. M. BOUILLAUD observes that the excrescences or granulations are most frequent on the valves, especially their free edges. He divides them into the *globular* or albuminous, and the *warty*. The former are soft, of a whitish, yellowish, or reddish hue, and easily detached; and originate in the organisation of adherent coagulable lymph, as observed to take place on the surface of other serous membranes. The warty excrescences are of a cartilaginous consistency and firmly attached. They are either distinct, or aggregated into groups presenting a cauliflower appearance; and vary in size from that of a millet-seed to that of a pea. Both these kinds of vegetations seldom exist alone, either on the valves or on the internal surface of the cavities; but are commonly attended by fibro-cartilaginous or calcareous induration of the valves; and when they are large, numerous, or aggregated, they necessarily occasion narrowing of the orifices, and an impediment to the action of the valves. — 3. *Adhesions* of the opposed surfaces of the internal membrane were first described by M. BOUILLAUD, who has adduced six cases in which he met with them. They are, however, rarely observed; for the force of the blood's circulation, and the movement of the parietes of the cavities and of the valves, prevent their formation, excepting at those places where these obstacles are the least, as between the less moveable parts of the valves, and the opposite surfaces of the ventricles. These adhesions disturb the regularity of the circulation, by preventing the valves from completely closing the orifices. Another species of adhesion is sometimes observed between the opposite margins of the valves in certain cases of narrowing of the orifices, which will be mentioned hereafter. — 4. *Organised false membranes* are also occasionally found covering a greater or less extent of the internal surface of the heart; and M. BOUILLAUD states, that he has seen these membranes consist of several superimposed layers. In place of these, small colourless patches, of from four to six lines in diameter, sometimes form on the endocardium, and may be removed, leaving it more opaque than natural. — In many cases, the supposed thickening of this tissue has been entirely owing to organised false membranes; but as often the endocardium is itself thickened, opaque, and its free surface unequal, somewhat wrinkled, and villous; this change extending, as stated above, to the connecting cellular tissue.

67. *c.* In the *third* or *chronic stage* of internal carditis, the cellulo-fibrous, the fibrous or fibro-cartilaginous, alterations or formations observed in the former stage are converted into the *cartilaginous, osseous,* or *calcareous state.* — 1. These latter productions sometimes consist of circumscribed points — occasionally of thin patches of the size of the finger-nail or even larger — or more rarely of rounded masses. — The valves may be almost entirely changed into a cartilaginous or osseous structure; but the fibrous zone of the orifices, and the points of the valves, most frequently undergo this alteration. Between these morbid patches or incrustations, the spaces are either natural or simply thickened. — The *osseous formations* often reach a very considerable size, and assume very irregular shapes, and sometimes even penetrate deeply into the substance of the heart. — 2. The cartilaginous or osseous valves are variously altered. As long as these changes consist of simple points or laminæ of small extent, the thickened and more rigid valves may still perform their offices; but when these alterations become more extensive and complete, the valves can no longer fulfil their functions. In this stage they present various lesions, as to form. Sometimes, as shown by LAENNEC, BERTIN, and others, their margins, especially those of the aortic valves, are folded *in*, so as to give an *inverted* appearance; and occasionally they are folded back, forming what has been described by Dr. HODGKIN and others under the name of *retroversion*. They may also be too short, or too unyielding, or too small, to close their respective orifices; and the orifices, on the other hand, may be too large for the valves. In either case, these latter will be *insufficient* for their purposes. — The diseased valves are occasionally perforated, or torn or ruptured in different directions; and those of the aorta have been found so completely torn as to be nearly detached. Sometimes one set of valves only is affected; but more frequently, when one set is very severely altered, another is opaque, thickened, or otherwise changed in some degree. — 3. *Contraction* of the heart's orifices is amongst the most common and most serious consequences of the changes now being considered. It may be so extreme as not to admit the point of the little finger, or even a quill. The thickened and hardened valves sometimes adhere at their opposite margins, leaving a permanent opening of a roundish, oval, crescent, or slitlike form; which, in the case of the auriculo-

ventricular valve, resembles the glottis or the os tincæ, owing to the thickening of the margins, and projection into the cavity of the ventricle. The thickening and induration occasionally extend to the tendons or even to the muscular columns. The semilunar valves also often stand firm and convex, or rigid. These changes have been well described by Mr. ADAMS and M. BOUILLAUD. — Dr. ELLIOTSON remarks that the valves of the pulmonary artery sometimes grow up so as to leave only a small round or triangular opening in their middle.

68. *d.* The inflammatory origin of the changes now described has been doubted by several pathologists, and even by LAENNEC; but it has been advocated by FRANK, KREYSIG, HILDENBRAND, ANDRAL, ELLIOTSON, BOUILLAUD, LATHAM, WATSON, and others. Osseous formations in the heart have been supposed to occur only in advanced age. BOUILLAUD states, that of 44 cases, 33 occurred in persons under fifty, and 19 out of these were observed in persons under thirty; one being only ten years, another seven, and a third ten months. I have met with this formation in two children, — one of seven, the other of ten years; and in both, the symptoms, and associated lesions observed on dissection, were obviously inflammatory. Indeed, the matter is put beyond dispute. — The *narrowing* of the orifices of the heart by chronic inflammation is, as remarked by a recent writer, very analogous to what takes place in other organs from this cause — as in the urethra, and lachrymal and biliary ducts, the pylorus, the rectum, &c.; and the hypertrophy of the heart which succeeds, may be compared to the thickening of the muscular coats of the bladder, stomach, and other hollow viscera, arising in such circumstances from the difficulty of expelling their contents owing to the obstruction. When inflammation attacks the internal surface of the heart, the parts of it about the boundaries of the cavities, and near the orifices, or covering them and the valves, are most liable to be affected, as commonly observed about the boundaries of other cavities and canals. — BICHAT had noticed the greater frequency of the lesions just mentioned in the left, than in the right, side of the heart. The fact is undoubted. M. BERTIN considered that inflammation and its consequences are more likely to be occasioned and maintained by the exciting properties of arterial blood, than by the inert venous blood returned to the right side of the heart. This, however, is not sufficient to explain the circumstance; for inflammations are more frequent in veins, than in arteries.

69. *B. Symptoms of Internal Carditis.* — *a.* In the *first or acute stage,* actual *pain* is seldom felt, unless the disease be associated with pericarditis or with pleuritis; but uneasiness, oppression, or anxiety, in the præcordia, with faintness, is always complained of. The *physical signs* require the closest attention. — 1. The præcordial region, in simple endocarditis, is shaken by the violence of the heart's action, the hand being forcibly resisted by the impulse when applied over this region. The pulsations are felt over a greater extent than natural, owing to the turgescence of the organ in an inflamed state; and a vibratory tremor, more or less marked, is also sometimes felt. — 2. *Percussion* furnishes a dull sound over a greater extent of surface than natural; from four to nine or twelve square inches. But, in order to distinguish this sound from that attending effusion into the pericardium, it is necessary to observe, that it coexists with a superficial, visible, and sensible pulsation of the heart; the beat being profound, and hardly visible or sensible in cases of pericarditis with effusion. — 3. *Auscultation* detects a bellows sound, which masks the two normal sounds, or one of them only. This sound is the louder, the stronger the action of the heart; and is also rougher, the greater the swelling of the valves, and the more abundant or concrete the exudation of lymph from the inflamed surface. Sometimes, when the palpitations are violent, a metallic sound isochronous with the systole of the ventricle is also heard. — 4. The *force* of the heart's contractions is changed both to the eye and to the touch, and the frequency equally affected, the pulse rising sometimes as high as 140 and 160, or even higher, in a minute, and becoming irregular, unequal, or intermittent. — 5. *Animal heat* is generally also increased, but not usually in proportion to the augmentation of the circulation. The arterial pulsations represent only the *frequency*, but not the *strength*, of the heart's action in this disease; for, whilst the contractions of the heart are energetic, the *pulse* is generally small, soft, and indistinct. This is owing to the obstacle opposed to the circulation by the swelling of the valves or orifices, or both; or by the fibrinous exudations formed around them; a smaller column of blood being thrown into the arterial trunks; hence, probably, arise the pallor, anxiety, jactitation, faintness, leipothymia, want of consciousness, &c., frequently also observed.

70. In general, the venous circulation is not materially disturbed in this stage of internal carditis; but when the above obstacles to the circulation through the orifices become considerable, dyspnœa, a bloated or livid appearance of the face, slight œdema of the extremities, and pulmonary or even cerebral congestion often supervene. In this case, the patient experiences the most distressing oppression, cannot lie down in bed, is watchful, restless, and subject to a constant jactitation. In the simple form of endocarditis, delirium seldom occurs; but temporary wandering of the mind, and sudden terror, or unconsciousness, are occasionally present when the dyspnœa is extreme. — The digestive functions, the secretions and excretions, are also more or less impaired; and in the more extreme states, cold sweats often break out.

71. The above symptoms appertain especially to the *acute form* of endocarditis, particularly when it is general. But when it is *partial*, or *sub-acute*, or *chronic*, the symptoms are not so prominently grouped; and it is, consequently, recognised with greater difficulty. An attentive observer, however, will seldom mistake it for any other disease, excepting pericarditis, with which it is very liable to be confounded, even by the most experienced. But the error is not material; for both diseases very often coexist, and the means of cure are the same in each. When pericarditis is attended by effusion, then it is readily distinguished from endocarditis by the circumstance mentioned above (§ 69.); but, when it gives rise merely to a pseudo-membranous exudation, a

diagnosis is formed between them with very great difficulty; the sounds, however, in this state of pericarditis, will be a tolerable guide to a correct inference.

72. *b. The symptoms of the second and third, or chronic, stages of internal carditis* have reference chiefly to the *structural changes* that have been induced. The disease may have terminated in resolution before advancing into these stages, the foregoing symptoms having disappeared. But, when it has been mistaken, or neglected, or imperfectly treated, it passes into these sub-acute and chronic states or stages; the inflammatory action gradually subsiding as to intensity, or passing into that slow or chronic form observed to produce similar changes in serous tissues to those which have been described (§ 66, 67.). — Of all the organic lesions consequent upon endocarditis, the different forms of *induration of the valves and contraction of the heart's orifices* are the most permanent; often continuing after the inflammatory action which produced them has disappeared, whether this action has been *acute, sub-acute*, or *chronic*.

73. *c.* The *symptoms* of induration of the valves and narrowing of the orifices are generally such as lead to the detection of these changes, as well as of the consecutive hypertrophy and dilatation. — 1. *Inspection* shows merely the extent, force, and rhythm of the pulsations. — 2. The *hand applied on the præcordial region* discovers a vibratory, or purring tremor, with irregularity, inequality, or intermissions of the heart's action; or a treble or quadruple movement, as well as the increased force and extent of the contractions. — 3. *Percussion* furnishes a dull sound to a greater extent than in health. — 4. *Auscultation* detects, during the contractions of the heart, a morbid sound, which is *blowing, filing, grating, rasping*, or *sawing*, as to its character, according to the resistance furnished by the diseased valves, to the degree of contraction of the orifices, to the capacity of the cavities, and to the strength of their parietes.—Each of these sounds may be either *double* or *single:* the former completely masking or replacing both the natural sounds; the latter, only one of them. The morbid sound varies in duration and intensity: it is sometimes sudden, short, abrupt, and jerk-like; in others, it is slow, prolonged, or drawn out. It is occasionally so loud as to be heard even at a short distance from the chest; and, in some cases, it is so slight as to be detected with difficulty. In a few instances of induration of the valves, the bellows sound assumes a sibillous character. — 5. *Pain* seldom attends the above lesion; but the patient complains of weight, or of uneasiness or embarrassment, at the præcordia; of palpitations, of sinking, or of faintness. The palpitations are excited by the least exertion or mental emotion; and are characterised, by the increased force, and the remarkable frequency, of the pulsations, which may reach 160 beats or upwards in the minute.

74. When, therefore, either of the morbid sounds just mentioned is present at the præcordial region, with a vibratory or purring tremor, palpitations, an irregular, tumultuous, or intermittent action of the heart, it is in the highest degree probable, that induration of the valves, and narrowing of one or more of the orifices, exist — particularly if the disease is of some months' or years' duration. This inference amounts to certainty, when, with the above *local* signs, the following *general* or sympathetic phenomena are present, especially a small, weak, or vibratory pulse, which contrasts remarkably with the energetic actions of the heart; dilatation of the superficial veins, particularly of those near the heart, as the jugulars, &c.; sallowness or lividity of the countenance; symptoms of congestion of the lungs, brain, liver, and mucous surfaces; passive hæmorrhages from the lungs and mucous membranes; dyspnœa, shortness of breath, or sense of oppression or stuffing in the chest, increased on slight exertion; effusions of fluid into serous cavities, or into cellular parts, &c.; and cerebral derangement, as restlessness, watchfulness, frightful dreams, jactitation, laborious breathing, &c. Pulsations of the jugular veins, synchronous with the pulse, are observed when a reflux of a portion of the blood takes place from the right auricle, during the contraction of the right ventricle, owing to insufficiency of the tricuspid valve, either from alterations in itself, or from dilatation of the auriculo-ventricular orifice.

75. *d. The diagnostic symptoms of lesions of the different valves, and of narrowing of the different orifices of the heart*, have been stated with more confidence than truth, by some who have made the stethoscope an instrument of parade and charlatanry. In answer to the question — Can this diagnosis be established? M. Bouillaud justly answers, that it is more curious than useful. — There is no doubt of the morbid sound being loudest at a point the nearest to the diseased orifice; and upon this, much of the diagnostic evidence rests. But further proof is requisite. When the *pulse* is examined in connection with the action of the heart, it is generally more irregular, unequal, intermittent, and smaller, in narrowing of the *aortic orifice*, than in that of the *left auriculo-ventricular orifice;* and the vibratory tremor of the pulse in the large arteries, first noticed by Corvisart, is most remarkable in the former case. The maximum also of the intensity of the purring tremor in the præcordial region, as well as the maximum intensity of the morbid sound, corresponds with the contracted orifice. — M. Bouillaud considers that synchronism of the morbid sound with the ventricular systole or diastole, signifies nothing; but in this he is incorrect; his opinion being the consequence of his views respecting the source of the natural sounds of the heart. — Narrowing of the *orifices of the right side* is infinitely less frequent than that of the left orifices; and is indicated by the correspondence of the maximum of the morbid sound and of the purring tremor with the situation of these orifices, and by the distension and pulsation of the large veins, especially of the jugulars.

76. Dr. Williams has divided structural lesions of the valves and orifices of the heart into two kinds — the *obstructive* and *regurgitant;* according as they *impede* the current of blood in its proper direction, or permit its *reflux*. But some alterations are both obstructive and regurgitant, as they impair both the opening and the closing of the valves. — *a. Obstruction at the aortic orifice* is attended by a bellows sound which is superficial, and occasionally sibillous, about the middle or top of the sternum, or about the cartilages of the fifth and sixth left ribs, and

which masks or replaces the *first* natural sound, and occasionally extends to the carotids. The *second* natural sound is either weak or indistinct, when the aortic valves are much diseased, the pulse being remarkably small and weak. — Obstruction of this orifice generally causes enlargement of the heart.—When lesions of the aortic valves render them *insufficient*, and occasion a *reflux* current into the ventricle, a short whiffing sound replaces the *second* natural sound at the middle of the sternum; the second natural sound in the pulmonary valves still remaining audible to the right of the sternum. Insufficiency of the aortic valves gives rise to dilatation, with hypertrophy of the left ventricle.

77. *b. Obstruction at the left auriculo-ventricular orifice*, or obstructive disease of the *mitral valve*, may be attended by a morbid sound or murmur at the time of the second natural sound, owing to the resistance to the current during the refilling of the ventricle; the morbid sound, however, not replacing the second normal sound, as the action of the semilunar valves may still be perfect, but merely attending it, or masking it, when loud. This lesion is accompanied by a small, but strong or hard pulse. It usually occasions hypertrophy of the left ventricle, sometimes with diminution of its cavity, and dilatation of the left auricle. — *Insufficiency* of the mitral valves produces a morbid sound at the time of the first natural sound, that is most distinct at the left margin of the sternum, between the third or fourth ribs, or rather more to the left, or as far as the left nipple, or a little below it; and that does not extend to the arteries. The pulse is always irregular or intermittent. — This lesion commonly gives rise to hypertrophy of the left ventricle, with dilatation of the auricle.

78. *c. Lesions of the semilunar pulmonary valves* are very rarely observed. Obstruction in this situation occasions a morbid sound at the middle of the sternum, more superficial and whizzing than that caused by disease of the aortic valves (Hope). The circumstances of the morbid sound being inaudible over the great arteries, as Dr. Williams observes, of its not affecting the pulse, and of its causing more marked signs of venous congestion and disease of the right side of the heart, are more to be depended upon, than the mere situation of the morbid sound, in the diagnosis of this alteration.

79. *d. Lesions of the tricuspid valve, and of the right auriculo-ventricular orifice*, are more common than those of the pulmonary valves; but less so than those of the mitral valve. They give rise to a deep blowing or filing sound, most distinct under the sternum at the juncture of the fourth rib. If the lesion *obstruct* the current of blood, the morbid sound will replace the *second* natural sound; but if it allow *regurgitation* into the auricle, the morbid sound will accompany the *first* sound; the regurgitation giving rise to pulsation in the jugular veins, and to dilatation of the right auricle, or ventricle, or of both.

80. *e. Adhesion of the auriculo-ventricular valves to the parietes of the heart*, according to M. Bouillaud, are attended by the symptoms of narrowing or contraction of the orifices, especially palpitations, the bellows sound, the purring tremor, dyspnœa, and venous congestions, with passive effusions; but are distinguished — 1st, by the more broad, less dry, and less rasping sound, than in narrowing; — 2d, by the less irregular, less unequal, and less intermittent pulsations of the heart; the purring tremor being more diffused, and less distinct, than in narrowing of the orifices; — 3d, by the pulse being less small, and the oppression at the præcordia, the venous congestions, and their consequences, being less remarkable than in the latter lesion.

81. *f. The diagnosis of thickening of the internal membrane of the heart*, whether this change depends upon a true hypertrophy of this tissue, or upon the organisation of a false membrane lining its surface, is frequently impossible. When the thickening extends to the valves, without any other lesion of them or of the orifices, a remarkable increase in the loudness of the sounds is produced — especially if the mitral valve is affected. When the valves, or the orifices, or the parietes of the compartments, are otherwise altered, as they most frequently are, contemporaneously with this change, the signs will have a particular reference to such alterations.

82. It is justly remarked, by Dr. Williams, that, when two or more of the preceding lesions are associated, the signs become complicated, and the obscurity of the case increased; for, unless the character and locality of the morbid sound be distinct, the more prominent may mask the others. When the sounds are different, one being filing or grating, and the other blowing, the difficulty is less, and the nature and position of each affection may be exactly indicated. Rasping, or sawing, sounds are very rarely produced by mere contractions, or by soft depositions, unless for a short time during increased action of the heart. When these sounds are permanent, they may be referred to cartilaginous or osseous deposits in or about some of the valves. Hypertrophy and dilatation often make the signs of diseased valves more evident, by augmenting the force of the current through the cavities, and rendering more distinct the place and order of the sounds.

ii. Inflammation of the Pericardium.—

Syn. *Carditis externa*, Author; *Pericarditis*, Auct. var.; *Carditis*, Sauvages, Vogel, &c.; *Inflammatio Cordis et Pericardii*, Senac; *Hertzbeutelentzüngdung*, Germ.; *Péricardite*, Fr.; *Inflammazion del Pericardio*, Ital.; *External Carditis, Inflammation of the Envelope of the Heart.*

83. Charact. — *Pain under the sternum, inclining to the left side and to the epigastrium, with tenderness on firm pressure in the latter situations; dyspnœa; anxiety, oppression, constriction, or tightness at the præcordia; great rapidity and irregularity of the heart's action, and of the pulse; inflammatory fever; and morbid sounds detected by percussion and auscultation.*

84. *A. History, &c.* — *Pericarditis* was first mentioned by Avenzoar, who was himself attacked by it, and was cured by bloodletting; but, excepting the cursory notice taken of it by Rondelet, Salius Diversus, and Forestus, little attention was directed to it, until Bonet, Hildanus, Berger, Morgagni, and others, recorded cases illustrative of its morbid relations. Still more recently, our knowledge of its nature

and treatment has been much advanced, by the writings of CORVISART, BURNS, KREYSIG, LAENNEC, TESTA, BERTIN, ELLIOTSON, STOKES, and others; and by numerous memoirs, which have appeared in the transactions of medical societies, and in periodical works, and to many of which references are subjoined.

85. *B. Structural Lesions.* — *a. In the acute stage of pericarditis* —*α.* The earliest change is *redness* of the pericardium, from capillary injection. In some cases, particularly when death has taken place rapidly, the redness is not remarkable, probably owing to the recession of the blood from the capillaries after death. The increased vascularity is principally seated in the subjacent or connecting cellular tissue; and the redness is sometimes increased by the infiltration of minute quantities of blood into this tissue, or into the serous membrane itself, so as to give rise to ecchymoses, or red points, spots or patches, or streaks. The thickness, transparency, and consistence of the pericardium, seldom undergo great changes at an early period of the disease; yet this membrane is often thicker and more opaque, than in the healthy state. It is generally detached with greater ease from the surface of the heart, and its removal shows the injection and redness, or infiltration of the connecting cellular tissue. — The natural exhalation from the surface of the pericardium is either increased in quantity, or remarkably altered in kind, or both; the *accumulated effusion*, which thus results, constituting a principal part of the changes produced by the disease.

86. *β.* The *effusion* into the pericardium presents various states, and undergoes changes of much importance as respects the subsequent course of the disease. — 1st. The effused fluid usually coagulates, or separates, into a turbid or flocculent serum and a concrete or fibrinous false membrane, which is organisable, and commonly covers the free surface of the cardiac envelope. In some instances, the coagulation is more irregular, or presents a curdled appearance, without being disposed in a membranous form over the external surface of the organ. The more fluid part of the effusion is generally serous, but it is sometimes sanguineous or tinged by the escape of a portion of the colouring substance of the blood. Occasionally the effused matter consists chiefly of coagulable lymph disposed in the form of false membrane; but more frequently the membranous depositions are accompanied by a quantity of fluid varying from a few ounces to several pounds. M. LOUIS adduces a case in which it amounted to four pounds; and CORVISART another, in which the pericardium contained a still larger quantity of a sero-puriform fluid. — 2d. In some cases of pericarditis, the effused matter consists of a homogeneous, inodorous, and *well-digested pus*, of the consistence of cream, and of a greyish, yellowish, or greenish white hue. The quantity of this matter varies as much as that of the former, or sero-pseudo-membranous effusion. — Cases of pericarditis giving rise to a purulent effusion have been recorded by P. FRANK, HASENOEHRL, MONRO, STOERCK, STOLL, LIEUTAUD, SENAC, BAILLIE, CORVISART, LOUIS, BOUILLAUD, and several recent writers. — Instances in which the fluid presents a *sero-puriform* character are frequent.

87. *γ.* The *coagulated* or *fibrinous lymph* formed in acute pericarditis is sometimes found in amorphous masses; but it is most frequently disposed in a membranous form, covering the greater part, or even the whole, of the free surface of the pericardium, especially of that part reflected over the heart. This false membrane varies in thickness from a fraction of a line to several lines. The appearance of the free surface of this membranous exudation is generally peculiar. CORVISART compared it to the internal surface of the second stomach of a calf. Sometimes it resembles the surface of a pine-apple. Dr. HOPE remarks, that, when the layer is thin, its free surface is often pitted with small depressions at regular intervals, presenting the aspect of a fine reticulation; and that, when it is thick, the surface is divided into more spacious cells, often as large as a pea, and separated by coarser partitions. In most of the cases which I have examined, the surface either was shaggy, or hanging in numerous short shreds — the "*Cor hirsutum, villosum, tomentosum*," of the older writers; or presented an appearance similar to that produced by pressing soft grease between two smooth plates and by forcibly separating them. In some preparations of my colleague Dr. SWEATMAN, these appearances are beautifully preserved, the membranous exudation in these having surrounded the whole of the heart. M. CRUVEILHIER and Dr. HOPE have delineated these changes in their pathological works. — In some instances, the effused lymph is arranged in transverse undulations, or it presents an indented or wrinkled form. It occasionally acquires a deeper hue, the older it becomes; or presents a deep brown or reddish brown colour, most probably derived from tha colouring matter of the blood which the effused fluid contained. — The more recent the membranous exudation, the more feeble is its *cohesion*; and the older it becomes, the greater is its tenacity and elasticity.

88. *δ.* The rapidity with which effusion takes place, in consequence of pericarditis, is often remarkable; and the celerity with which organisation commences in the coagulated lymph, is often equally great. This is most evident when the lymph agglutinates the opposing surfaces of the membrane. Many years ago, I demonstrated that, when coagulable lymph is effused on an inflamed serous surface, and is brought in contact with that portion of the surface directly opposite to it, inflammatory action is generally thereby excited in the latter situation, without having extended to it continuously from its former seat. In all such cases, the lymph acts as an irritant to the healthy surface opposite, and sooner or later induces inflammatory action and adhesions of the opposite parts. This always takes place when the pericardium is acutely inflamed, and when the quantity of the fluid effused is not too great to prevent adhesion from taking place.

89. *b. In the chronic stage or state of pericarditis*, the pericardium becomes thickened, or hypertrophied; but this change is most remarkable in the subjacent cellular tissue. The apparent thickening is also sometimes owing to a fine and dense false membrane so firmly adherent to the pericardium as to resemble it on a superficial view. In this state or stage of the disease, the

capillary vessels and larger branches are developed beyond their natural size. Sometimes, in addition to these changes, a quantity of puriform or sero-puriform matter is found in the pericardium; but more frequently a quantity of serum, either limpid, turbid, opaque, flocculent, or sanguineous, is met with. — *a*, The *coagulable lymph* effused in the acute state of the disease, generally undergoes various changes in the course of this stage. In its place there is sometimes only found cellular adhesions, general or partial, or merely simple bands stretching between the opposite surfaces. In other cases, organised false membranes cover a portion, or even the whole, of the surface, and present a whitish, milky, or opaline appearance, particularly when they are limited in extent. In all these cases, more or less fluid, such as just described, is also present. Partial or limited false membranes are seen not only on the surface of the heart, but frequently also on the parts of the large vessels covered by the pericardium, and especially over the root of the aorta. These membranes are usually cellulo-fibrous or fibrous; but, in the more chronic cases, they may assume the cartilaginous or even the osseous state. In a few instances, the heart has appeared as if more or less enveloped in an osseous shell. Sometimes these changes take place in the fibrous structure of the pericardium itself. Occasionally, in place of the morbid productions being disposed in the form of bands or membranes, they assume that of granulations, or excrescences.

90. *β*. The effused fluid and morbid productions in the pericardium are often attended by various changes in the *substance*, or in the *internal surface* and compartments, of the heart, generally resulting from the extension, the pre-existence, or the co-existence, of inflammatory action in these parts, especially in the endocardium. M. BOUILLAUD attributes much of the alteration presented by the substance of the organ in these cases to the compression which the matters in the pericardium exert, and to the consequent embarrassment of the heart's action. This is probably the case; but much is also owing to the consequences of associated inflammation of the internal surface of the organ; for, although this disease may commence in either surface, it seldom runs its course in a simple form, or without extending to the other, or even to other structures. However this may be, it is indisputable, that, in a very large proportion of cases of pericarditis, and especially in those which are chronic, more or less of the changes characterising, or resulting from, *internal carditis* (§ 66, 67.) are also observed, as well as many of those alterations which are yet to be considered. — M. BOUILLAUD has noticed *atrophy* of the heart as one of the changes consequent upon membranous productions and effusions in the pericardium. This change I have also remarked, as well as loss of the colour — an extreme paleness of the heart's substance. This latter change was observed in a case published by me in 1821. — But *hypertrophy*, &c., of one or more of the compartments of the organ is most frequently seen in connection with pericarditis. In some instances, *induration* and thickening of the pericardiac envelope extends from the subjacent cellular tissue to the muscular structure, or rather, perhaps, to the cellular tissue connecting the fibres; and these parts assume, in rare cases, a nearly cartilaginous state. — *Softening* attended by a dark or deep red colour (*brownish red softening*), or by loss of colour (*yellowish white softening*), of the substance of the heart, also is occasionally met with in pericarditis; the former most frequently in the acute state, the latter in the chronic. But these and still more remarkable changes are observed chiefly in cases of pericarditis associated with acute carditis (§ 109.). The coincidence of yellowish white softening of the substance of the organ with pericarditis was noticed by LAENNEC, and has been attributed by BOUILLAUD to the macerating effect of the serum contained in the pericardium. In a case of rheumatic pericarditis, readily recognised during life, this form of softening was observed by me on dissection; but there was scarcely any effusion, and there had been no evidence of much having existed at any period of the disease, although partial false membranes had formed. — In thirty-six cases in which M. LOUIS observed effusion in this disease, the fluid was sero-sanguineous in four, a turbid serum in nine, sero-puriform in fifteen, and purulent in seven. — According to my own observation, a turbid or flocculent serum is most frequently met with; a purulent matter being found chiefly in sub-acute and chronic cases, and independently of any ulceration. (See further, as to *Effusion of Fluid into the Pericardium*, the article, DROPSY OF THE CAVITIES OF THE CHEST, § 148. *et seq.*)

91. *γ*. The *external surface* of the pericardium is not always free from very decided marks of inflammatory action. — These marks are, however, found chiefly when pericarditis has been preceded, attended, or followed, by pleuritis, pleuro-pneumonia, or by inflammation of the superior surface of the diaphragm, or of the mediastinum. In cases of this kind, and perhaps also in others of great severity, or where the unattached sac has been principally affected, coagulated lymph is not infrequently found uniting the external surface of the pericardium to the pleura, a turbid serum being more or less abundantly effused into the pleural cavity. Whilst writing this article, I had an opportunity of examining, after death, a remarkable case of this kind; and another, presenting the same appearances, was brought into the dissecting-room of the Middlesex Hospital Medical School, whilst this sheet was about to go to press, the man having died suddenly.

92. *δ*. When pericarditis does not *terminate* in resolution, and in the absorption of whatever lymph has been effused, the next best termination that remains, as Dr. HOPE observes, is adhesion of the opposite surfaces; for, should this not take place, the false membrane becomes a secreting surface, effusing more and more fluid until the cavity is completely distended, and the action of the heart at last abolished. But, should adhesion take place, further effusion is thereby prevented, and life is often prolonged for many months, or even years; although adhesion occasions another form of organic change, which ultimately destroys the patient. — That adhesion occurs in one case and not in another, is entirely owing to the quality of the lymph, which depends upon the state of inflammatory action, and that, in its turn, upon the constitutional powers; for

the disposition to adhesion will be great in proportion to the abundance of coagulable lymph and scantiness of serous fluid effused, — a large quantity of watery, serous, or puriform fluid preventing adhesion from taking place.

93. The *process* of adhesion is very manifest. — When the more watery parts are absorbed, either the lymph on the opposite surfaces of the pericardium come in contact, as when the whole surface is inflamed, or that on the one surface comes in contact with the opposite part, excites inflammatory action in it (§ 88.), and a reciprocative effusion of lymph; both portions blending, thickening or coagulating, and gradually becoming organised. — As organisation commences and proceeds, blood-stains, straggling red lines, or pink-coloured vascularity, appear in the coagulated lymph, which now assumes more and more of a cellular or cellulo-fibrous character, and agglutinates more or less firmly and extensively the opposite parts. The more recent adhesions are generally thick, friable, and separable by tearing into two layers, one adhering to each surface of the pericardium; but those which are of longer standing are thinner and firmer, and consist of fine layers of dense cellular tissue. In some very old cases, this medium of adhesion becomes so thin as to be hardly perceptible, and the union so firm and intimate as not to admit of separation, thereby giving rise to the deception of the pericardium having been wanting.

94. It not infrequently happens, that, after the acute symptoms have been partially subdued, and the disease has continued for some months in a chronic state, false membranes, or adhesions, having been formed, the inflammation either recurs, or assumes a more acute state, and gives rise to an additional deposition of lymph, thereby thickening the adventitious membrane very remarkably. In these cases, the layers are successively redder as they are nearer the heart, and exhibit different degrees of consistence,—one layer or part being almost fluid or purulent, while another is cellular-fibrous, or semi-cartilaginous, or presents the density of tubercular induration. In these, changes in the substance of the heart, or in its internal surface, orifices, or valves, or in both orders of parts, similar to those already alluded to (§ 66, 67.), are generally also observed; and a fatal termination is seldom long deferred.

95. C. *Symptoms and Diagnosis of Pericarditis, and of its Consequences.* — Inflammation of the pericardium was considered by Laennec and several recent writers as the most difficult of the diseases of the heart to detect. This arose from too little attention having been paid to the rational symptoms attending it, and from the sounds occasioned by it having been imperfectly ascertained. The difficulty has been much exaggerated; for, of the numerous cases in which I have been consulted since 1818, some of which were published as early as 1821, the disease was detected during life in all but one, which I saw with Dr. Duffin. This case was complicated with other lesions, and terminated fatally a few hours afterwards; the constant vomiting and affection of the diaphragm having masked the symptoms indicative of pericarditis. That this disease is often overlooked, or confounded with inflammations of the pleura, lungs, diaphragm, &c., with which it is often complicated, cannot be doubted; and that it is, in its various grades of intensity and states of association, a much more common malady than has been supposed, is shown by the fact of M. Louis having found it in the proportion of one case in twenty in all the dissections he has made. This is still further proved by the circumstance of my having seen as many as four cases of the disease in one day: three of them in children under ten years of age, who were brought to my house, and who were examined also by Mr. H. Barker, the present house-surgeon to the North London Hospital, and then one of my pupils. On two occasions, I have met with the disease in two children of the same parents, and once in two brothers at the same time. — Although auscultation and percussion furnish some of the most important signs of pericarditis, and of its consequences, yet they must not be depended upon without carefully ascertaining the rational symptoms, local and general, and cautiously comparing and estimating all the phenomena observed.

96. *a. Symptoms of the acute or first stage.* — (*a*) The *local signs* of acute pericarditis consist — 1st, of altered *sensibility;* — 2d, of disordered *action;* — 3d, of change in *form;* — 4th, of morbid *sounds* heard on percussion and auscultation. — *a. Pain,* more or less acute, is very frequently complained of under the left nipple, extending to the lower extremity of the sternum, occupying sometimes the whole præcordia, irradiating thence to the left axilla, or arm, or to the diaphragm and epigastrium, or to the left hypochondrium. The pain is pungent, lancinating, tearing or violent; is often attended by a sense of compression and constriction, and by anxiety; and is increased on percussion, on a full respiration, on coughing, on holding the chest erect, and on lying on the left side. In many cases, however, the pain is dull, or so slight as to be little or not at all complained of; but if pressure be made upon the intercostal spaces, or upwards from the epigastrium towards the pericardium, more or less internal pain will be excited. Cases also occasionally, occur in which no pain is felt at the præcordia, and, consequently, where the existence of pain on pressure in these situations has been neither inquired after nor ascertained; and instances are not uncommon where the pain of pericarditis is masked by an associated acute pleuritis or severe articular rheumatism. I agree with Dr. Elliotson and Mr. Mayne in considering pain or tenderness, circumscribed in extent, and confined chiefly to the left side of the epigastrium, and felt most when pressure is directed upwards on the diaphragm and under the anterior margins of the left false ribs, as one of the most constant symptoms of pericarditis. — M. Bouillaud observes, that the more simple the disease, the more frequently is it latent, and in this he agrees with Laennec; that the same holds also in respect of rheumatismal pericarditis, which is often attended by little pain, when the adjoining pleura is unaffected; and that the pain is most severe when the costal pleura in the vicinity, and especially when the diaphragmatic pleura, is implicated.

97. *β.* The *pulsations of the heart* are stronger and more frequent than natural; sometimes regular, at other times irregular, tumultuous, unequal, or intermittent, with exacerbations of the

palpitations. The impulse is then readily felt by the hand, and perceived on inspection. But frequently it can be detected by neither, when copious effusion has taken place into the pericardium; and the palpitations present at the commencement, then disappear. In these cases, the actions of the heart are either really or apparently feebler than natural. M. BOUILLAUD states, that when the inflammation is passing into the formative action — when organisation is commencing in the effused lymph — the second movement of the heart seems double, or imparts a crepitating or crackling sensation to the hand.

98. γ. A more or less evident *prominence* of the præcordia, or of the cartilages of the left ribs, mentioned by M. LOUIS, is often observed, especially when the disease affects children. It depends either upon effusion into the pericardium and vascular swelling of the affected tissues, or upon inordinate action and consecutive hypertrophy. The concomitant signs, especially the states of pulsation and impulse, will readily disclose the cause of this appearance.

99. δ. *Percussion* furnishes a dull sound to an extent in proportion to the effusion, and at a period of the disease varying with the commencement and progress of this lesion. At first, or in that form of pericarditis called *dry*, but little effusion, or merely a thin membranous exudation of lymph, takes place; and the dulness on percussion is not much increased. Hence it is only when effusion is considerable that this means of investigation is of much assistance in this disease. When the fluid is not abundant, the position of the patient will also modify the extent or situation of the dull sound, or even prevent it from being remarked, owing to the gravitation of the liquid to the more depending part of the pericardium.

100. ε. *Auscultation* affords no sign that can be alone depended upon in the acute stage of pericarditis. The sound resembling the *creaking of new leather* is rarely heard in this period, but more frequently in the next. It was first noticed by M. COLLIN, and afterwards mentioned by me in the article AUSCULTATION (§ 41.), where I attempted to explain its occurrence. Dr. W. STOKES next treated of it in an able paper on this disease. I have already alluded to cases in which I have met with it, and one in which it was distinctly heard by the patient herself (§ 15.). In its true form, it rarely, or only temporarily, occurs. But a *friction sound*, which has been noticed by STOKES, MAYNE, WATSON, myself, and others, is frequently heard in this stage, or when little or no effusion exists; and closely resembles the friction, rubbing, or to-and-fro sound in pleuritis. In some cases, the rubbing sound resembles the rasping, grating, or sawing sound in induration of the valves, from which it must be distinguished, as well as from the bellows or blowing sound which is also often heard in pericarditis. When the rubbing sound assumes a grating or rasping character, and is thus liable to be mistaken for similar sounds caused by valvular disease, it will generally be found to arise from the rough surfaces of false membranes covering the surface of the pericardium. In these cases also, M. BOUILLAUD likens the friction sound to the rubbing together of taffeta or of parchment. This kind of rubbing sound is to be distinguished from the rasping or sawing sound caused by disease of the valves, by its being double, and more superficial and diffused than it. — The *bellows sound*, also, may be confounded with the more superficial and diffused rubbing or crushing sound; but a slight attention will detect the difference between them, arising from the circumstance just stated. This sound, in its different modifications of a filing, sawing, or rasping sound, is always *single* — is a rush, or whiz, as Dr. WATSON remarks, and is synchronous with the systole of the ventricles, and deep-seated; the *rubbing* or *friction* sound, in its different states, is a *double* sound, and suggests the idea of the rubbing together of the opposite surfaces of the pericardium, roughened by the exudation of lymph; it ceases when a copious effusion of serum takes place, or when the surfaces become adherent. Both these sounds are sometimes coexistent, especially when the internal and external membranes of the heart are inflamed at the same time; and they may be then severally ascertained by an experienced and careful observer. I have detected a bellows sound in the larger proportion of cases of pericarditis that I have seen in children. — The *rubbing* or *friction* (STOKES, MAYNE, BOUILLAUD), the *to-and-fro* (WATSON), the *crushing* (BOUILLAUD), and the *ascending* and *descending* (LAENNEC and REYNAUD), *sounds*, are either the same or slight modifications of the same phenomenon, — are heard chiefly in acute pericarditis, — are double sounds, although louder during the systole than during the diastole of the ventricles, — are caused by changes affecting the pericardium, — are not heard in all cases, and only in certain stages or states of the disease, — and depend upon different lesions from those which occasion the bellows, rasping, or sawing sounds. These latter proceed from alterations *within* the heart, the former from changes *external* to it. — The *creaking* or leather sound, according to my observation, occurs chiefly in the chronic stage of the disease; is a different sound from that of rubbing or friction; does not depend upon that cause, but upon thickening and induration of the pericardium reflected over the heart and of the connecting cellular tissue, or upon the existence of a dense or an elastic false membrane, as stated above (§ 15.).

101. When copious effusion has taken place into the pericardium, the natural sounds of the heart, as well as the morbid sounds arising from changes about the valves or in the orifices of the organ, will be heard more obscurely, or at a greater distance and deeper in the chest. — The pulsations will also be found unequal, irregular, intermittent, or laborious, not only on auscultation, but also upon applying the hand over the præcordia. — I have already imputed the bellows sound in pericarditis to changes in the valves and orifices of the heart — to alterations within the organ. This sound has been differently accounted for by Dr. HOPE and others. But it will be found (and Dr. WATSON and M. BOUILLAUD confirm the opinion) to proceed in every case from the cause now assigned; this cause itself resulting from internal carditis preceding, accompanying, or following the inflammation of the pericardium. In such cases, the internal carditis may be limited to the valves or

to the orifices, or may affect both, or may extend also to the surface of one or more of the cavities. When the affection of the internal parts is merely an extension of the inflammation from the pericardium to them, this limitation to the valves and orifices is the more likely to exist. It is manifest from this, that the recognition of the different sounds is of great importance in ascertaining the extent and association of inflammations of the heart.

102. (*b*) The *sympathetic or general symptoms*, when duly weighed, are of the utmost importance in pericarditis, and particularly when estimated in connection with the local and auscultatory signs; but they present the utmost diversity, arising from the intensity and complication of the disease. — *α*. In the acute state, a more or less violent *febrile commotion* is usually observed to follow chills or rigors. The *pulse* at the commencement is generally strong, full, quick, and hard; and the *skin* is hot, but perspirable. The pulse afterwards becomes unequal, oppressed, irregular, small and rapid, and often intermittent, especially at an advanced stage. Sometimes it presents more or less of these latter characters from the first; and the skin is then hot and unperspirable; but occasionally the extremities are cold, or are covered with a cold perspiration. More or less *anxiety* at the præcordia is complained of; and it generally increases, and is almost insupportable, causing extreme restlessness and agitation. *Dyspnœa*, an anxious respiration, and a feeling of overwhelming oppression, are also present, with frequent sighing, which gives momentary relief. If the adjoining pleura is implicated, respiration is hurried, short, and shallow, sometimes interrupted by broken sighs, or by deep catching inspirations. The patient has a sense of suffocation, of constriction, of internal heat, and of fulness in the præcordia, and towards the left side, occasionally accompanied, or alternating, with acute or lancinating pain or with jactitation. — *Cough* is not always present, unless the disease is associated with pleuro-pneumony or pleurisy, and it then has the characters usually observed in these diseases. *Blood* taken from a vein, especially when pericarditis is thus complicated, or when it is connected with acute or articular rheumatism, is cupped and very remarkably buffed, the coagulum being firm. The *pulse* commonly ranges from 120 to 150, and the respiration from 35 to 45, in a minute. *Watchfulness* is generally distressing; and, if the patient fall asleep, he suddenly awakes in a state of agitation and alarm. — The *countenance* is pale, anxious, constricted, and sunk; but it is sometimes, especially as the disease advances, equally pale or equally red; it is always expressive of distress and solicitude. Occasionally the muscles of the face are convulsed, or contracted so as to give rise to the *risus sardonicus*. Although strong palpitations are usually present, particularly in the early stage, they are seldom much complained of. The patient generally assumes the supine posture, or lies upon the right side with the head and shoulders considerably elevated. Most of the above symptoms are aggravated by motion, by compression of the chest, by turning on the left side, and by a high temperature. To these supervene, if the disease be not arrested in a very few days, singultus, sometimes temporary or slight delirium — more rarely maniacal excitement, or attacks of general convulsions. If the malady continue for several days, the face becomes pale, wan, turgid, or livid, and œdema of the extremities and other symptoms indicative of organic change of the heart are observed.

103. *β*. In acute pericarditis, other symptoms, much less constant than most of the above, are often observed; whilst others, which usually attend symptomatic inflammatory fever, as loss of appetite, thirst, loaded or foul tongue, costiveness, and scanty high-coloured urine, are seldom absent. *Vomiting* is an occasional symptom, and is observed chiefly in the most violent cases, and when pericarditis is *complicated* with inflammation of the diaphragmatic pleura. Indeed, the above violent state of constitutional commotion is most frequently seen in this complication, many of the symptoms depending more upon the latter than upon the former. *Hiccup*, delirium, and convulsive motions of the muscles of the face, are also more frequent when the disease is thus associated. The course of this complication is often rapid, and its termination fatal, when its nature is not recognised sufficiently early. When vomiting is urgent, and the pain in the epigastrium is severe, and accompanied by tenderness, the disease may be mistaken for gastritis; and the consequent singultus, and restlessness; the rapid, weak, and irregular pulse; cold sweats on the extremities, &c.; may be attributed to the unfavourable termination of this latter malady. In a case of this kind, which ended fatally in a few hours after medical aid was required, and which I saw only once, the disease was thus mistaken by me. But this occurred many years ago, and in circumstances which precluded a minute inquiry into the local signs.

104. *γ*. Many of the symptoms, also, especially the bellows sound; the rapid, weak, small tremulous, and irregular pulse; the tendency to syncope on motion; the disaccordance between the pulse at the wrist, and the actions and impulse of the heart as felt at the præcordia; the extreme anxiety and restlessness, &c.; may be referred chiefly to the co-existence of inflammation in the adjoining substance of the heart, or in the orifices and valves. Extreme or constant dyspnœa; the dulness on percussion; the weak and diffused impulse of the heart; the obscure or deep-seated sounds, &c.; the smallness, weakness, and irregularity of the pulse; the tumid, bloated, and livid state of the countenance; and the fulness of the jugular veins; are to be attributed chiefly to effusion into the pericardium and pleura, especially into the former. If faintness or syncope occur independently of motion, the pulse nearly disappearing, or becoming tremulous and intermittent, the formation of polypous concretions in the cavities of the heart may be suspected.

105. *δ*. In some uncomplicated cases, acute pericarditis has run its course without the constitutional symptoms having been at any time very severe; but in these, the anxiety, oppression, or constriction at the præcordia; the state of the heart's action, and of the circulation, especially the rapidity and irregularity of the pulse; will arrest the attention of the practitioner, and lead to a more minute examination of the local

signs. The more prominent symptoms of an associated pleurisy, or pleuro-pneumony, may mask those of pericarditis, or the one disease may be mistaken for the other; but as the treatment ought not to be thereby rendered more inert, the consequences will not be serious. When the attention is alive to this complication, and to the points of resemblance between these diseases, the distinguishing characters of each will be generally ascertained: inattention alone will mislead. Even in the most obscure cases of pericarditis, the recognition of one or two symptoms, that cannot fail of taking place, will generally lead to the detection of others which are pathognomonic, if they be properly inquired for; and pain or tenderness on pressure at the left side of the epigastrium, &c. (§ 96.), the morbid sounds discovered by percussion and auscultation, and the disordered state of the circulating and respiratory functions just mentioned, will indicate the nature of the malady. The more acute and fully developed states of pericarditis can be mistaken only for inflammation of the diaphragmatic and left pleura; but a careful observation of the local and general symptoms will readily show the difference between them, and detect them when associated with each other. The sole error that can take place in the diagnosis, when they are thus associated, is to recognise only one of them; but this will not affect the treatment, and not very materially the prognosis. The most serious mistakes are most likely to occur with respect to simple pericarditis, particularly when the local symptoms are slight; for it has occasionally happened that this disease has been found after death, although it was not suspected during the life of the patient. In this case, it is doubtful whether the error in diagnosis has been owing more to the latent nature of the malady, than to the inattention of the medical attendant.

106. ε. Pericarditis may, from the commencement, exist in a *slight* or *mild form*, when its detection is very difficult, and it is very liable to be neglected. It then generally assumes a *chronic state*. Owing to the absence of manifest local symptoms, to the slight febrile symptoms attending it, and to the patient's neglect of his ailments, it has also been termed *latent* or obscure. Yet the disease may exist in a slow or chronic form, and manifest evident signs of its nature, from its commencement; but this is comparatively rare. The chronic state may also be consequent upon the acute; especially when the latter has been too long neglected, or treated with too little decision, or when the patient's constitution or previous health has been impaired. If, owing to these latter circumstances especially, the inflammatory action has terminated in effusion or in suppuration, the chronic or sub-acute state will often follow, and will generally be indicated by the usual signs of effusion into the pericardium; by pain, however slight, and tenderness in the situations particularised above (§ 96.); by slow fever, characterised by exacerbations in the evening or after a meal; by a frequent, weak, and irregular pulse; by more or less weight, or oppression, or anxiety, at the præcordia; and by a bloated or livid countenance, œdema, &c.

107. (c) When *false membranes*, or *adhesions*, have formed in the course of *chronic pericarditis*, the symptoms are generally obscure, and the diagnosis difficult. The inflammatory action, which produced these changes, with the attendant symptoms, may have subsided, or may not have been clearly manifested at any time. Yet I have met with cases in which the existence of these alterations appeared evident; and chiefly from the following circumstances: — 1st. The history of the case, and of the symptoms referrible to the præcordial region, and to the functions of the heart, and of the adjoining organs; — 2d. The frequent connection of these symptoms with articular rheumatism; — 3d. The presence of a true creaking sound, or a sound resembling that produced by new leather; — 4th. An undulation or pulsation observable at the termination and to the left of the ensiform cartilage of the sternum, the upper and left part of the epigastrium being drawn inwards and upwards at each systole of the heart; a similar appearance being sometimes also observed in the intercostal spaces of the left floating ribs, particularly in thin persons; — and, 5th. A superficial and diffused scraping or rough friction sound heard upon auscultation.

108. The connection of the true *creaking sound* with thickening of the cardiac portion of the pericardium, or with a dense and elastic false membrane formed on its surface, has been already noticed (§ 100.). The undulation or *pulsation* in the situations just mentioned has been observed by me in two or three cases, and in the very remarkable instance above alluded to (§ 12.), where the lower part of the sternum and the anterior margins of the left lower ribs were drawn inwards, or towards the spine. The *scraping sound* occurs only when the productions on the surface of the pericardium have assumed an unequal, cartilaginous, or even an osseous form; and when the symptoms referrible to the heart have existed for a long time. But in most of the cases in which I have observed either organised false membranes or adhesions in the pericardium, disease of the valves or orifices, and other organic lesions of the organ, have also been present, as will be noticed in the sequel.

iii. INFLAMMATION OF THE STRUCTURE OF THE HEART. — SYN. *Carditis, Carditis vera, Incandentia Cordis,* Auct. var.; *Inflammation of the Substance of the Heart, True Carditis.*

109. CHARACT.—*Acute fever, with burning pain or soreness in the cardiac region, with tenderness on pressure, particularly at the epigastrium; palpitations, tumultuous and very irregular actions and intermissions of the heart, succeeded by swoonings, &c.*

110. I have ventured to state the symptoms which seem most characteristic of inflammation of the substance of the heart, although the histories of cases, where this disease was the most unequivocally present, have very rarely been observed with any degree of precision; the local symptoms having been altogether overlooked. One of the most remarkable instances of carditis on record, as respects the appearances after death, conveys no information, as to the history of the disease, further than that it was obviously connected with articular rheumatism; so palpable a circumstance even as this having escaped the person who treated the case (*Med. Chirurg. Trans.* vol. vii. p. 319.). In true carditis, the cellular tissue connecting the other textures

seems to be principally affected. Some doubts, however, have been entertained as to the inflammation commencing in this tissue; but there is no reason that it should not originate in this, as in the other textures of the organ. It is very probable that it most frequently begins in either the internal or the external surface, and extends thence to the connecting cellular tissue, and to the whole parietes of one or more compartments of the organ. It may even commence both in the substance and in either of the surfaces simultaneously; it certainly is very rarely or never limited to the former; inflammation of the substance of the heart being always accompanied with pericarditis or with endocarditis, or even with both. — The appearances after death, as well as the symptoms, vary remarkably according to the intensity of the morbid action in relation to the constitutional powers, to the previous health of the patient, and to the extent to which the different compartments and constituent tissues of the organ are affected by it. — The consequences and terminations of the disease depend also upon the same circumstances.

111. *A. Structural Lesions in True Carditis.* — The earlier changes consequent upon inflammation of the substance of the heart very rarely come before the pathologist; and even the more remote are seldom observed. In all the cases adduced by Hildanus, Stoerck, Meckel, and Corvisart, the pericardium was also inflamed; but the state of the muscular structure of the organ has been very imperfectly described by them. — *a. Collections and infiltrations of pus* in the substance of the heart have been very rarely observed. In only two or three cases has the purulent matter been found encysted. In most instances, these collections seemed to have been consequent upon acute or sub-acute inflammation; the structure of the organ being of a reddish brown hue, softened, and injected. In other cases, especially when the matter was surrounded by a distinct cyst, the symptoms were less acute, and those referrible to the heart much less prominent, or altogether latent. In nearly all the instances where this product of inflammation was found, the surfaces, or the valves or orifices, also presented indications of their participation in the morbid action.*

112. *c. Gangrene* consequent upon true carditis has been noticed by Senac, Corvisart, Portal, Leroux, and Kennedy. It is manifestly a *post mortem* alteration, accelerated by a depraved habit of body. All the cases adduced by these writers show that the inflammation of the heart was preceded by serious constitutional disturbance, and by a morbid state of the circulating fluids, that had favoured the occurrence of this termination, which had taken place either at the moment of dissolution, or soon afterwards. M. Portal states that, when the muscular structure of the heart becomes gangrenous, it is softened and impregnated with an ichorous and greenish serum, and that it exhales a fœtid odour. He believes that it may even be the seat of a kind of dry gangrene, and adduces a case in support of this opinion: — A man, of about fifty, in the course of a periodic fever, experienced palpitations and other signs of cardiac disease. He died somewhat suddenly; and, on dissection, the substance of the heart was found to be remarkably soft, and friable. It exhaled a putrid odour, was easily torn, and was devoid of serum. — The instance adduced by Dr. Kennedy was characterised during life by previous cachexia; by burning heat at the præcordia, ushered in by rigors; by exhaustion, restlessness, and extreme anxiety; by dyspnœa and palpitations; by a small, hard, rapid, irregular, and, lastly, intermittent pulse; by a parched, rough, and black state of the tongue, mouth, and fauces; by leipothymia; and by other symptoms of putro-adynamia. *Eight hours* after death, the heart was found remarkably dark; its substance break-

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* 1. Corvisart (*Opus cit.* obs. 37.) adduces a case in which, after fever attended by dyspnœa, pain in the head, præcordia, and left thorax, with anxiety, a feeble, irregular, and intermittent pulse, and delirium, death took place on the seventh day. The pericardium was found distended by purulent matter, the structure of the heart being softened and infiltrated with a similar substance. — 2. In a very instructive case recorded by M. Raikem (*Bullet. de la Faculté*, l'an. 1809.), violent pain and anxiety in the cardiac region, palpitations, dyspnœa, and leipothymia, consequent upon rheumatism and rigors, were complained of. To these were added, a bloated and anxious countenance, distension of the jugular veins, small and frequent respiration, irregular and excited action of the heart, pain at the epigastrium, and vomitings, followed by delirium, and by death about the fourteenth day. The heart was found large and flabby. Signs of inflammatory action were observed in its left valves, and orifices. Its substance was of a reddish brown hue, injected, and contained three or four small collections of an opaque sanious pus. — 3. M. Simonet has recorded a case in which the disease was connected with rheumatism. When the patient was brought to the hospital, the action of the heart was tumultuous and extensive, the pulse contracted and irregular, the respiration difficult, and the extremities cold. Bloodletting was practised; but he died a few hours afterwards in a fit of syncope. Purulent collections were found in the substance of the heart, especially in the interventricular partition. The internal surface of the cavities was red in several places; the muscular structure being of a yellowish grey hue, softened, and torn with the least effort. (Bouillaud, *Op. cit.* p. 266.) — 4. Dr. Graves was consulted by a gentleman, fifty-five years of age, who had complained, for many months, of palpitations and dyspnœa, and more recently of anasarca. Severe pain and anxiety were felt at the region of the heart, the former darting over the chest. Dr. Graves detected hypertrophy and dilatation of the ventricles, with a loud bellows sound, the purring tremor, and a very irregular pulse; and inferred the presence of disease of the valves. The patient died suddenly a few weeks afterwards. There were found considerable effusions of serum in both pleural cavities, enlargement of the heart, and adhesion of it to the pericardium by bands of coagulable lymph, which were strong at the apex. At this situation, was discovered a cavity in the muscular structure, with a regularly defined wall, which contained about two ounces of pus. The parietes of both ventricles were greatly thickened. All the valves were more or less affected. The valves of the aorta were nearly altogether ossified. (*Lond. Med. and Surg. Journ.* vol. vii. p. 803.) — 5. In a case detailed by M. C. Broussais (*Annal. de la Méd. Physiol.* t. xxi. 1832.), the abscess in the substance of the heart was *encysted.* — A soldier, nineteen years of age, was attacked with small-pox, in the course of which abscesses, enormous infiltration of the left arm, probably caused by a consecutive phlebitis, &c., supervened. A constant fever, with anxiety, marasmus, &c., ultimately became the principal symptoms. He died on the fifty-fifth day from the attack. An abscess, of the size of a filbert, was found in the muscular substance of the left ventricle, near its base. The matter consisted of well digested pus, which was contained in a consistent cyst. — 6. M. Laennec found a similar abscess in the substance of the left ventricle of a child who died of pericarditis. A case resembling the foregoing is also recorded by Henning (Hufeland's *Journ. der Pract. Arzneyk.* b. vii. st. iv. p. 144.). Two cases are recorded by M. Marechal, in which purulent collections were formed in the cavities of the heart, connected with their internal surface, and surrounded by a thin friable membrane. The patients had experienced symptoms referrible to the heart during the latter days of existence. (*Journ. Hebdom. de Méd.* t. ii. p. 494.)

ing down, when pressed gently with the finger. It exhaled a putrid odour; no blood exuded from its vessels; and all its cavities were empty; the large thoracic and abdominal veins being loaded with black grumous blood.

113. *b. Softening* of the substance of the heart is one of the earliest alterations consequent upon inflammation of it; but softening, unconnected with vascular congestion and discolouration, cannot be altogether attributed to this state of morbid action. The *reddish brown softening* sometimes observed is manifestly owing to the most acute form of inflammation; the muscular substance of the heart being of a reddish, brownish, or livid hue, and the connecting cellular tissue injected or engorged with dark blood. Sometimes blood, of a very dark colour, and more or less altered, is found infiltrated between the muscular interstices, or underneath the serous membranes covering the internal and external surfaces of the organ; these membranes participating in the morbid action. In a case examined by Mr. Stanley, the muscular fibres were found of a very dark colour, of a very soft and loose texture, and easily separated and torn by the fingers; the nutrient vessels being loaded with venous blood. A section of the ventricles presented numerous small collections of *dark-coloured pus* among the muscular fasciculi. Some of these were seated near to the cavity of the ventricle, while others were more superficial, and had elevated the reflected pericardium from the heart. The muscular fibres of the auricles were also softened, and loaded with dark blood.

114. *d.* M. Bouillaud has described two other varieties of softening of the heart, which he believes to arise from inflammation. In the one, the muscular structure is of a *whitish*, or *pale grey*, colour; in the other, it is of a *yellow* hue. — *Whitish* or *greyish* softening he supposes to be the second stage of the reddish brown softening; and to indicate a further advanced stage of carditis. That such is the case, appears partly proved by its connection in some instances with suppuration, or purulent infiltration of the muscular tissue of the organ, although attended by much less vascular injection and congestion, than the reddish brown softening. Corvisart remarks, that carditis renders, after a time, the muscular structure of the heart soft and pale; the fibres losing their cohesion, and the connecting cellular tissue becoming loose, or infiltrated by a lymphatico-puriform matter. The parietes of the heart are torn with the greatest ease, and are broken down with the least pressure. (*Op. cit.* p. 257.)

115. The *third* variety, or *yellowish* softening of Laennec and Bouillaud, often is manifestly connected with chronic true carditis, although by no means generally. It differs from the former (§ 114.) only in its yellow colour; and is most frequently greatest in the interventricular septum, and the centre of the muscular structure of the ventricles; the parts nearest the internal and external surfaces of the organ being less evidently changed, or presenting reddened points of the healthy consistence. — The second of these forms of softening was observed by me in a patient who died of the consequences of inflammation of the membranes of the spinal chord, many months after having experienced an attack of acute carditis, connected with articular rheumatism (see *Lond. Med. Repos.* vol. xv. p. 26.); and, judging from the appearances in that instance, this softening seemed to result from a change in the nutrition of the organ, consequent upon the antecedent inflammation of it. Bouillaud considers, that its frequent coincidence with purulent effusion into the pericardium, shows that it depends upon this latter circumstance. The juster inference would be, to impute both the change in the substance of the organ, and the morbid secretion from the pericardiac surface, to perverted vascular action, conjoined with impaired organic nervous power. That these are the true pathological conditions, is shown by the circumstances in which this, as well as the yellowish variety of softening, is found. — I have observed them both, — this latter variety especially, — where there had been no evidence of cardiac disease, either at any previous period, or in a chronic form; and particularly in cases of general cachexia, and of constitutional disease, attended by discolouration of the surface of the body, — by a bloodless, yellowish, or tallowy or waxy appearance of the integuments, — and by other signs of a poor and deficient state of the blood, consequent upon impaired organic nervous energy and assimilation, as generally seen in the advanced stages of local malignant or contaminating maladies.

116. *e. Ulceration of the heart* may arise from an abscess, encysted or non-encysted, having opened either into one of the cavities, or into the pericardium. In the former case, the purulent collection, and the subsequent secretion from the diseased part, mix with the blood; in the latter, they accumulate in the pericardiac cavity, and increase a pre-existent pericarditis. M. Bouillaud supposes that they may open both ways, and occasion *perforation* of one of the compartments of the organ. It is more probable that, after opening in one direction, the tissue surrounding the abscess gives way, owing to the loss of substance, and to the softening consequent upon this lesion. That many of the cases of *rupture* of the heart arise from this circumstance, will appear in the sequel. Ulcerations are generally observed in the internal surface, most commonly in that of the left ventricle. Inflammation having commenced in, or extended to, the connecting cellular tissue, and having given rise, at one or more points, to an effusion of a serous or puriform fluid sufficient to detach the internal membrane from its vascular connections, this membrane necessarily loses its vitality at these points, and yields before the matter underneath it. Erosion of the endocardium, followed by ulceration, and limited softening, &c. of the substance of the organ, is thus produced; the number, extent, and depth of the ulcers being various.

117. Ulceration, in its course through the substance of the heart, gives rise to changes analogous to those observed after ulceration of arteries. The thinned and softened portion of the parietes yields before the pressure made upon it by the column of blood, and a *sacculated aneurism*, or *tumour*, varying from the size of a filbert to that of a large orange, is formed, — its cavity, as in the case of other aneurisms, being often in a great measure filled with lamellated coagula. The aneurismal tumours, consequent upon ulcer-

ation, generally form adhesions between the opposed surfaces of the pericardium stretched over them, their rupture being thereby prevented. They have been found only in the left ventricle; and, according to M. Breschet, the summit of the ventricle is their sole seat; but M. Reynaud has shown, by the analysis of thirteen cases, that seven are exceptions to this rule.

118. *f. Perforation* of the parietes of one of the compartments of the heart may occur in either of the ways above described: from ulceration consequent upon abscess; from simple ulceration following inflammatory action; or from ulceration attended by an aneurismal tumour. It seldom or never, perhaps, proceeds from the last of these, for the reason just assigned; and whenever it does take place in either of the former cases, rupture or laceration of the remaining inflamed and softened tissues in the seat of ulceration usually takes place. When the perforation is made into the pericardium, death occurs suddenly; but when it is seated in the interventricular septum, then an admixture of arterial with venous blood results, and life may be prolonged for some time. — Instances of perforation from ulceration have been recorded by Rullier, Andral, and others. M. Maruejouls met with this lesion in the left auricle.

119. *g. Induration* and *cartilaginous* and *osseous transformations* of the substance of the heart are doubtless amongst the more remote or chronic lesions consequent upon carditis. Simple *induration* varies in degree and situation, and is generally limited to, or is most remarkable in, a single compartment. It may be seated in the parietes of a ventricle, or in those of an auricle, or in the septa, or in the fleshy columns. Corvisart, Laennec, and Broussais have observed it to equal that of the shell of a nut. It is, however, most frequently characterised by a transformation into a *cartilaginous*, or an *osseous*, or *osseo-calcareous substance*, and limited to a portion only of a compartment. The connecting cellular tissue, especially that beneath either of the membranes, seems to be the original seat of this change, the muscular fibres being atrophied, from the pressure of the indurated, hypertrophied, or transformed cellular tissue connecting them. The cartilaginous and osseous degenerations of a portion of the substance of the heart, have been observed by Morgagni, Haller, Senac, Corvisart, Baillie, Filling, Renauldin, Bichat, Bertin, and many others. They are, however, much more frequently met with in the pericardium. The most remarkable instance of ossification of the muscular structure of the heart is recorded by A. Burns. In general, when ossific deposits are found in this latter situation, they seem to have only extended to it from either of the surfaces, especially the pericardiac; or rather from the cellular tissue subjacent to these surfaces, to that connecting the muscular fasciculi, which become atrophied as the osseous or cartilaginous change proceeds. This seems well illustrated by an interesting case recorded by Mr. Smith (*Dublin Journ. of Med. Science*, vol. ix. p. 419.).

120. That the change of a portion of the substance of the organ into the cartilaginous or osseous states is actually the result of a form of chronic inflammatory action, seems to be proved by what is observed in connection with these lesions in other situations, and by the circumstances of their association with increased vascularity and swelling in hypertrophy of the parts in which they are seated, and of their occurrence after undoubted evidences of inflammation had been manifested. That the state of the circulating fluids may, however, be indirectly concerned in the production of these changes, as consequences of chronic inflammatory action, in preference to any other, is not improbable; the superabundance in the blood, owing to impaired eliminating function, of those substances or ultimate products of assimilation, which contribute to the formation of the morbid depositions in question, possibly favouring their supervention.

121. *B. The Symptoms and Diagnosis of true Carditis* are so little different from those of internal and external carditis, that nothing precise can be advanced under this head. The circumstance of inflammation of the substance of the heart occurring chiefly as a consequence, or as a complication, of inflammation of either or of both the surfaces, nearly precludes the possibility of distinguishing between it and them, or of ascertaining its existence when thus associated, more especially when the disease exists in a sub-acute or chronic form. This difficulty has been acknowledged by Corvisart, Laennec, and Bouillaud. M. Laennec very justly remarks, that there is not on record a single case of carditis, the symptoms and course of which have been accurately observed. M. Bouillaud states, that he has never met with a case of carditis uncomplicated with pericarditis or endocarditis. It has been supposed, that the dark softening of the structure of the heart, so very frequently observed after death from adynamic or putro-adynamic fevers, has been owing to the complication, or supervention, of inflammation of this organ. The uncommon frequency of the pulse in many of these cases has been considered as evidence of this; yet the slighter forms of simple endocarditis would give rise to the same symptoms; and these, very probably, not infrequently occur in the course of those fevers — modified, however, by the constitutional malady; although in general the heart's substance undergoes no further change from them than other organs. In the advanced stages, or near the termination of these diseases, the heart participates in the alterations which take place in muscular parts generally, and becomes more or less softened and discoloured. This change, however, is independent of inflammation, and is the consequence of extremely depressed vital power, and impaired cohesion of the soft solids (see Fever, § 18. 102.), in connection with deterioration of the circulating fluids. This change of the substance of the heart is also not infrequent in cases where the blood has been altered by the absorption of morbid matters, or by the infectious operation of putrid and contaminating fluids and miasms. I have remarked it in the putro-adynamic, or liquescent form of remittent fever endemic in low marshy districts within the tropics, and in the more malignant states of puerperal fevers, especially those met with in crowded or ill-ventilated lying-in hospitals (see Puerperal Diseases). Several writers on the plague state that they have observed it in fatal cases of that pestilence. I also have found it after death

from pestilential yellow fever; and in a slighter degree from pestilential cholera. (See art. Pestilences.)

122. *a.* Notwithstanding the difficulty of determining the existence of carditis, during the life of the patient, Drs. Heim and Krause believe that a diagnosis may be made in some instances; and, judging from two cases, in which I was consulted, and in which the opinion as to its nature was confirmed by the appearances observed after death, I nearly concur with them, especially if the disease exist in a very acute and fully developed form. In this case, the patient experiences a violent pain in the region of the heart, with anxiety, preceded or attended by rigors, chills, or tremblings of the whole frame. To these succeed increased heat about the præcordia, or in the trunk, whilst the extremities and face are cold, and the whole surface is covered by perspiration, which is cold on the extremities. The pain is concentrated in the situation of the heart, is lacerating or rending, accompanied by the utmost agitation and expression of anxiety and distress, sometimes by screams, and occasionally by general convulsions and swoonings. The patient feels every pulsation of the heart, rolls about to obtain ease, and presses his hand forcibly against the præcordia. The chest is elevated, the head thrown back, and the face and hands covered with cold sweats. There is great thirst, but drink is refused on its reaching the lips; and there is often loquacity, passing into delirium as the disease advances. If no vascular depletion has been practised, the pulsations are indistinct, or fluttering, or tumultuous. After bloodletting, the action of the heart becomes more developed; palpitations, attended by intense suffering, occasionally take place, and, at other times, syncope supervenes, or they both alternate. Immediately upon opening a vein, syncope or convulsions are apt to occur; but, upon placing the finger on the orifice till the patient recovers, the depletion can be carried to a great amount, with relief to all the symptoms. The pulse varies remarkably, but is generally unequal or irregular, and remarkably small and weak, or indistinct. There is neither cough nor expectoration, nor vomiting; but a frequent expression of pain and distress. The pain is increased by each contraction of the heart, so as to cause the patient to complain of palpitations, even when the impulse is not sensibly increased. If the disease is not soon arrested, constant jactitation, or tremor, recurring fits of syncope, delirium, and death, take place; or, in consequence of the association with it of inflammation of the internal or external membranes, and of the effusion of lymph, the phenomena, local and general, observed in the advanced stages of internal and external carditis, supervene and constitute the chief characteristics of the malady. When acute carditis is associated with either of the other varieties, or passes into them, then the local and physical signs proper to each will be detected accordingly on percussion and auscultation.

123. These are the most constant phenomena of acute carditis, according to the description of Dr. Heim, and the history of two cases which fell under my observation. The seizure is generally sudden, and the disease reaches its acme about the third day. In one of my cases, death took place on the fourth day. The patient (who was attended also by Dr. Walshman and another practitioner) was about fifty years of age, and of a full habit of body. In the spring of 1821, whilst labouring under an attack of rheumatism, he was recommended by some person to take a strong dose of croton oil. He took three drops, which produced violent purging and vomiting. The rheumatism suddenly ceased, and was speedily followed by the most distressing pain and anxiety in the region of the heart, and entirely confined to it. There was no morbid sound on auscultation, although nearly all the symptoms enumerated above were present. The patient was repeatedly bled, but extreme restlessness and jactitation appeared, and death by syncope soon afterwards took place. On dissection, the pericardium presented hardly any signs of inflammation; but the substance of the heart was inflamed, and portions of the internal surface more slightly. The alterations, however, were not so extensive as was anticipated; probably owing to the activity of the treatment, as medical aid was promptly procured and the disease at once recognised, and to the rapidity of the fatal termination. In the other case, which occurred more recently, and which was of longer duration, dark softening, as described above, was very remarkable, with the usual products of inflammation on both the internal and external membranes, particularly the latter.

124. *b. The consecutive alterations* on true carditis are even more occult than the acute stage of the disease itself. Indeed, as these alterations most frequently proceed from a sub-acute or chronic state of carditis, or from inflammation limited to one or two compartments of the organ, their greater obscurity is to be anticipated. When *abscess* or *ulceration* is followed by *perforation* or *rupture*, then sudden death takes place, unless the alteration occurs in the interventricular septum. But the symptoms attending these lesions, previously to their reaching a fatal extent, have not been ascertained; and it is doubtful whether or not they admit of being distinguished. It is necessary to this end, that cases of this kind should be carefully observed, and accurately described; but there is none on record possessed of either of these qualities. The same observations apply to the *sacculated dilatation* or *aneurism* of the heart (§ 117.), consequent upon ulceration or abscess. In none of the cases of it which have been published, was this lesion either discovered or suspected during life. M. Breschet mentions only the signs that may be expected to occur, not those which have been actually observed; and M. Bouillaud advances no further. In the case detailed by M. Reynaud, an affection of the heart was never indicated, the patient having died of a severe nervous disease, caused by the oxyde of lead, in a manufactory where he wrought; and the cases adduced by the authors referred to hereafter furnish quite as little information.

125. *c. Softening* of the heart, consequent upon various grades of inflammatory action, is indicated by a few symptoms, which, when duly weighed in connection with the previous history of the case, may lead the acute physician to presume its existence with some truth. These symptoms, however, taken by themselves, often attend other diseases characterised by extreme

asthenia, and even the asthenic functional disorders of this organ (§ 39.). But when, after more or less acute or sub-acute symptoms referrible to the præcordia, especially if attended by any of the morbid sounds, or other physical signs observed in external or internal carditis, or after dyspnœa, &c., the impulse of the heart at the præcordia, and the pulse at the wrist, become obscure, weak, and irregular; the latter being small or indistinct, the face livid or tumid, and the extremities œdematous, the dyspnœa increased or more constant; and when fainting or syncope occur frequently, or from very slight causes — then softening of the muscular structure of the heart may be presumed. Still all these symptoms may depend upon effusion into the pericardium, which, however, is often associated with softening of the organ. But a careful examination of the chest by percussion and auscultation, and the diagnostic symptoms adduced in the article on DROPSY OF THE PERICARDIUM (§ 151.) will often lead to a just conclusion. The softening of the heart, which, in a slighter degree, may be presumed to exist during convalescence from low or malignant fevers, is generally attended by a small and quick pulse, by a very weak and limited impulse, and by frequent returns of faintness or syncope. In the softening observed in very old people, the pulse is often slow, feeble, indistinct, or intermittent, or irregular; and dyspnœa, with many of the symptoms just mentioned, is generally present.

126. iv. *Of the* CAUSES *and Developement of Inflammations of the Heart and Pericardium.* — Inflammations of the *surfaces and substance of the heart* arise from the same *predisposing* and *exciting causes*. When either of these forms of carditis proceeds directly from these causes, or independently of a pre-existing malady, it has been denominated *primary* or *idiopathic;* but when it has followed another disease, and when a connection can be traced between both, it has been called *consecutive* or *symptomatic*. The *causes* already adduced, under the heads of *predisposing* (§ 18.), and *exciting* (§ 19.) are principally concerned in the production of the primary states of these inflammations. Some of those which have been termed *pathological* (§ 20.) chiefly occasion the consecutive forms of carditis.

127. *A.* Of the *predisposing causes* (§ 18.) already stated, plethora, the rheumatic and arthritic diathesis, the irritable and sanguineous temperaments, hereditary constitution, mental emotions, and early age, seem to be most concerned in producing inflammations of the heart and pericardium. Although these diseases may occur at any age, yet they are most frequently met with between the ages of six and thirty-five. M. BOUILLAUD assigns the period between ten and thirty as that of their most common occurrence. I have, however, observed a large proportion of cases between five and ten years of age, and after thirty. I agree with him in considering them most frequent at those seasons when the vicissitudes of temperature and season are the greatest; and I may add, during spring, when north-east winds are most prevalent.

128. *B.* The *exciting causes* (§ 19.) comprise nearly all those just referred to; especially the mechanical, the traumatic, the physical, and the moral, exciting causes.—Of the *physical* causes, the most common are — exposure to cold when the body is perspiring, or after it has been much overheated or excited, and wearing damp clothes or sleeping in damp sheets or beds. The impression of cold after the copious transpiration and exhaustion caused by bodily or mental exertion, or by both conjoined, is very apt not only to produce inflammation of either of the surfaces of the heart, but also to occasion pneumonia or pleuritis to be associated with it. A young man of talent, after addressing a meeting under great mental excitement for upwards of an hour, exposed himself immediately to a cold easterly wind in the month of March; and was soon afterwards seized with pericarditis, complicated with pleuritis of the left side. A middle-aged man, after great muscular exertion and fatigue, allowed himself to be suddenly chilled: he was afterwards attacked by internal carditis, which soon became associated with pericarditis. The dangerous and often fatal consequences of violent or prolonged exertions in working the pumps of leaky or sinking vessels, are generally owing to the production of this malady in its most acute form. Of the truth of this, the author had, many years ago, a painful opportunity of assuring himself. The *moral causes* enumerated above (§ 19. (*c*)), and in the article DISEASE (§ 53.), sometimes either induce, or concur with other causes in occasioning, one or other of the forms of carditis.

129. *C.* The pathological states which have been adduced (§ 20.), are by much the most common causes of inflammation of the internal and external surfaces of the heart; and of these the most frequently observed is *rheumatism*, particularly the *acute articular form* of that disease. Internal or external carditis may be connected with rheumatism in *three* modes: — 1st. The cardiac inflammation may follow the disappearance, or suppression, of the rheumatic affection, and may thus appear as a *metastasis*, or translation of this affection; — 2d. It may take place before the rheumatic disorder has ceased in an extremity or external part of the body; and co-exist with this disorder in one or more joints, or in these situations, the external affection being, however, much less severe after the developement of the cardiac malady; — 3d. Rheumatism may extend itself to the heart or pericardium, without abatement in its external seat, or may affect, almost simultaneously, one or more joints and the heart; or a very acute arthritic rheumatism may mask a sub-acute internal or external carditis. Of these three modes of connection, the first and second are the most frequent; but the third is by no means rare. I believe that the more acute the rheumatic complaint, and the more it affects the joints, the greater is the risk of its occasioning carditis or pericarditis; the risk being also greater, the younger the patient: and I am moreover of opinion, that this connection between inflammations of the heart and rheumatism is much more frequent at the present day, than twenty years ago. Twenty-three years since, when I published a dissertation on rheumatism, and had my attention as alive to this circumstance as now, and with equal opportunities of meeting with it in public institutions, it was much less frequently observed. The modes of ascertaining it have certainly been improved

since then; but nearly as much now is often lost by inattention to the physiological or rational symptoms, as is gained by ascertaining the physical signs. Besides, as I have always resorted to auscultation and percussion since 1819, when I frequently accompanied LAENNEC in his rounds, the disease was almost as likely to have been detected by me then as now.

130. The next most frequent pathological conditions whence carditis, especially external carditis, may proceed, are *pleurisy* and *pleuropneumony*. The former disease may occur in consequence of the extension of the latter; or they may both appear almost simultaneously. I have even seen pericarditis give rise to, or followed by, pleuritis. Inflammations of the heart, thus associated, are most commonly caused by some one of the numerous modes in which cold is applied to the surface — or rather in which the animal caloric is carried off — when the body is perspiring, especially after exertion or fatigue, and in the rheumatic diathesis. — *Gout* is also sometimes a cause of carditis; and, I think, of the internal form of the disease, in preference to pericarditis. Internal carditis occasionally appears at an advanced stage of, or during convalescence from, either of the eruptive fevers. It, as well as other forms of the disease, may also follow other fevers, and the complaints mentioned above (§ 20.).

131. v. *The* DIAGNOSIS *of Inflammations of the Heart*, may be inferred from the description I have given of the symptoms attending each of the varieties; but as these varieties are often associated with each other, or in some measure pass into one another, as the inflammatory action predominates more or less in one of the constituent tissues of the organ, so the symptoms will vary in different cases, and even in different periods of the same case. Attention, however, to the following circumstances, and groups of morbid phenomena, will generally enable the practitioner to arrive at a tolerably just conclusion as to the nature of the disease: — 1st. The situation of the pain, in the more acute cases, and the tenderness, soreness, or pain on pressure felt in the left and upper part of the epigastrium, and in the left anterior intercostal spaces; — 2d. The increase of pain on stretching upwards or backwards, and the inability to lie on the left side; — 3d. The frequent extension of pain to the left axilla, shoulder, or arm, and the occasional numbness of the latter; — 4th. The greatness of the anxiety in proportion to the cough; the anxious, haggard, or peculiar expression of countenance; and the bloated or livid appearance of the face at a more advanced stage; — 5th. The state of the pulse at the wrist examined in connection with the actions and impulse of the heart; the great frequency and irregularity of the latter, and the smallness, weakness, &c. of the former; — 6th. The palpitations and tendency to syncope, or the alternation of these symptoms, and their connection with pain, anxiety, dyspnœa, restlessness, or jactitation; — 7th. The signs on percussion and auscultation, especially the *single bellows* or *blowing sound*, with all its modifications; and the *double friction*, rubbing and creaking sounds: the former having reference to changes within the *heart;* the latter to alterations within the *pericardium*.

132. vi. *The* COMPLICATIONS *of Inflammations of the Heart* have been already noticed in general terms (§ 32.). Inflammation of the *internal membrane*, whether acute, sub-acute, or chronic, is often associated with, or gives rise to, *pericarditis*, at an early period of its progress; but this latter is much more frequently complicated with, or occasions, the former. Signs of endocarditis are more commonly and more early detected in the course of pericarditis, than those of pericarditis are in the course of endocarditis; and both may be further associated with inflammation of the cellular tissue or substance of the heart, or *true carditis*, in various degrees, or to a greater or less extent, as respects the different compartments of the organ. — *A. Internal carditis* is much more commonly observed in a complicated than in a simple state, especially when it is at all advanced. It presents itself in connection with the following diseases and probably in a ratio of frequency approaching the order in which I am about to enumerate them: — 1st. With pericarditis and articular rheumatism; — 2d. With pericarditis only; — 3d. With rheumatism only; — 4th. With pneumonia, pertussis, and pleuritis; — 5th. With inflammation of the bloodvessels, especially phlebitis; — 6th. With eruptive, or adynamic fevers; — 7th. With purulent collections or caries in distant parts. Internal carditis, when associated with rheumatism or with pulmonary or pleuritic diseases, is generally also connected with pericarditis; but when it supervenes in the course of phlebitis, or of fever, or from some cause which contaminates the circulating fluids, then it is generally unconnected with pericarditis, although the substance of the heart may be more or less implicated, or even softened.

133. *B. Pericarditis* is also much more frequently met with, even in its early stages, in a complicated than in a simple form — generally in connection — 1st. With internal carditis, either acute or chronic; — 2d. With articular rheumatism; — 3d. With both internal carditis and rheumatism; this being oftenest observed; — 4th. With pleuritis, either pulmonary, diaphragmatic, or costal; — 5th. With pleuro-pneumony; — 6th. With inflammation of the diaphragm or mediastinum; — 7th. With true carditis; — 8th. With peritonitis; — 9th. With inflammation of some one of the abdominal viscera; — and, 10th. With eruptive fevers. Two or more even of these complications may exist in the same case, especially internal and external carditis, pleuritis, and articular rheumatism; pericarditis, diaphragmitis, and pneumonia, &c. A body was lately brought into the dissecting-room of the Middlesex Hospital medical school, in which the liver was found inflamed and enlarged. It had formed adhesions with the diaphragm on one side, and with the adjoining viscera on the other. Between these viscera and the concave surface of the liver, the adhesions formed a large sac containing a turbid serum. The *pericardium* and diaphragm were inflamed, as well as the pleura on both sides. The pericardium and pleural cavities contained much turbid thick serum. — When pericarditis is associated with peritonitis or with inflammation of some of the abdominal viscera, the additional complication of pleuritis, especially diaphragmatic pleuritis of the same side, is not infrequent. BOUILLAUD adduces an instance of splenitis, diaphragmatic

pleuritis of the left side, and pericarditis, in the same patient. The opinion of CORVISART, that acute pericarditis rarely or never exists without being complicated, in some period or other of its course, is very nearly if not altogether true. — *C.* Of the complication of *true carditis* little further need be added. It can hardly exist without more or less inflammation of one or both surfaces of the heart; and in the few cases of it that have been observed, several were also connected with rheumatism, with pleuro-pneumony, with eruptive and other fevers, with phlebitis, and with purulent or sanious matters absorbed into the circulation.

134. vii. *Of the* PROGRESS, *Duration, and Terminations of Inflammations af the Heart.* — *A.* — *a. Internal carditis* may be *acute, sub-acute,* or *chronic,* and all the intermediate degrees. The most acute form may, especially from the effects of treatment, assume a mild and very chronic state; and this latter state may acquire greater activity, and become much more severe or acute. This latter change is, however, less frequent than the former. Where an amelioration has taken place, a recurrence or exasperation of the acute symptoms is very apt to occur. The most acute cases, M. BOUILLAUD observed, arose from sudden chills whilst the body was perspiring, chiefly in persons of the lymphatico-sanguine temperament, and employed in laborious occupations; hot stimulating liquors, taken with the view of recalling the perspiration to the surface, having assisted in developing the disease. When the less severe cases appear in connection with rheumatism, as they often do, in one or other of the modes above stated (§ 129.), a stimulating treatment of the latter disease renders much more acute the cardiac affection.

135. *b.* The *duration* of endocarditis is most indefinite, and altogether dependent upon the severity of the disease, the habit of body, age, strength, and constitution of the patient, the nature of the complication, the mode of treatment, and the period of recourse to it. — *Acute endocarditis* may terminate fatally in two or three days; and in this case, death is caused chiefly by the formation of fibrinous concretions, or coagula, in the cavities of the heart. When complicated with pericarditis, or with pleuro-pneumony, its duration will generally accord with that observed in these diseases. — The slighter or more *chronic forms* of internal carditis are of long duration, the more concealed states being prolonged indefinitely, or even for years; and organic lesions, especially of the valves and orifices of the organ, are usually the result at more or less early periods of their course. The inflammatory action either subsides or entirely ceases, after having produced these lesions, or it still continues in an obscure form. In the former case, especially when the amelioration proceeds from judicious treatment and regimen, the disease may remain, even for years, either stationary or more or less mitigated; but, in the latter, it generally advances with varying degrees of rapidity, until the functions of the organ and of the adjoining viscera are more or less impeded, or altogether interrupted; or until fatal congestions take place in vital parts, or dangerous effusions of blood or of serum supervene in important organs, or from mucous or serous surfaces.

136. *B.* — *a* The *progress* and *duration* of *pericarditis* also vary with the causes which occasion the attack, with the age, temperament, and habit of body of the patient; and with the morbid connections and treatment of the disease. — The most *acute form* may terminate fatally with great rapidity. M. ANDRAL records a case which was fatal in twenty-seven hours. The celebrated MIRABEAU was carried off by it so rapidly as to lead to the suspicion of his having been poisoned: he was only improperly treated, although in the usual manner at that time in France. Such violent cases are generally complicated, either with internal carditis, or with pleuritis, diaphragmatis, &c.; or with two or even more of these inflammations (§ 133.). The more moderate or favourable cases, however, generally terminate about the seventh or ninth days, or between the seventh and fourteenth. But there are exceptions to this.—The slighter and more *chronic grades* of pericarditis may continue for some months; and the consequences, particularly adhesions, connecting the pericardium, partially or generally, to the surface of the heart, may remain much longer, or for years; and, in some cases, especially when these lesions are slight, without materially disturbing the health. These adhesions are frequently attended by increased redness of the membrane, and by a little turbid serum, unless when they have obliterated all remains of the cavity. BERTIN, ELLIOTSON, and BOUILLAUD, believe that they do not occasion, even when general, any inconvenience beyond what proceeds from other co-existent lesions. But this is too favourable a view. They assist in developing, if they be not already associated with, still more serious alterations of the heart; and these latter frequently occasion other changes, either in collatitious or remote organs, more especially serous or sanguineous effusions; and thereby greatly abridge the period of existence.

137. viii. *The* PROGNOSIS *of Inflammations of the Heart* ought to be given with caution, generally with reservations, even when the most favourable circumstances are present. — *A.* In *endocarditis,* in its more severe states, there is always more or less danger; and the danger becomes extreme when the anxiety is very great, when the pulse is very frequent and irregular, and when swoonings or cold perspirations supervene. The slighter or more *chronic states* of the disease might be amenable to treatment, if it were possible to ascertain their presence, before they produce lesions which are but little under the control of medicine. But where these exist, in a manifest degree, the prognosis becomes unfavourable in proportion as they oppose the circulation through the compartments of the heart; death being the ultimate result, although it may be long deferred, and various intermediate changes may occur.

138. *B. Pericarditis* is always a dangerous malady; yet a considerable proportion of the cases will recover, if their nature be early recognised, and if an appropriate treatment be prescribed. M. LOUIS considers that perfect or partial recovery — partial, inasmuch as organic change of some kind remains, particularly adhesions of the pericardium to the heart — occurs in five cases out of six. If, however, the disease,

whether acute, sub-acute, or chronic, has given rise to effusion, an unfavourable opinion ought to be entertained of it, and especially if the patient be far advanced in life, or of a cachectic habit of body. Whether the effusion be puriform, or sero-sanguineous, or pseudo-membranous, or sero-albuminous, the question is chiefly as to the length of time that may elapse before a fatal issue takes place; much depending upon the symptoms and signs indicative of the amount of effusion, upon the states of the pulse and of the respiration, and upon the age and vital energies of the patient. When the effusion follows rapidly upon an acute attack, especially if there has been great frequency of pulse, and depressed constitutional powers, the danger becomes much more impending, than when effusion takes place more slowly and to a less amount. If pericarditis be associated with endocarditis, as indicated by the bellows sound, or by any of its modifications, or with pleuritis, pleuro-pneumony, or diaphragmitis, the danger is thereby increased very greatly — and increased in proportion to the intensity or extent of these inflammations. When the sub-acute or chronic disease has given rise, at more advanced periods, to adhesions, or to false membranes (§ 107.), the actions of the heart and diaphragm may be much disordered, and the functions of respiration, and of circulation in related or remote parts, greatly disturbed; but these consequences are not always observed. Patients have lived for years without much disorder being complained of; although more frequently these functions, particularly the latter, are more or less deranged — impeded circulation, or effusion into some cavity or organ, sooner or later taking place.

139. *C.* Of the prognosis of *true carditis* it is unnecessary to speak. If it be presumed to exist, the opinion of the result should be unfavourable, inasmuch as a degree of inflammation of the substance of the heart so intense as to be recognisable, generally induces the most serious changes either on one of the surfaces, or in the structure of the organ. If the symptoms of *softening* of the heart (§ 125.) be such as to admit of recognition, with any degree of confidence, the prognosis is extremely unfavourable, unless this lesion have taken place in fever, when a more favourable opinion may be entertained; recovery sometimes taking place during an energetic recourse to tonics, chalybeates, change of air, &c. The other consequences of carditis need not be noticed at this place, as they rarely admit of recognition during the life of patient.

140. ix. TREATMENT OF INFLAMMATIONS OF THE HEART. — The different forms of carditis require very nearly the same means of cure, the chief modifications consisting in the extent to which vascular depletions should be carried, in the various circumstances that usually present themselves; and in the choice of additional agents for averting the more serious changes, which are apt to take place. — *A. Bloodletting* is necessary in the three varieties of carditis, and especially when either of them is associated with pleuritis, or pleuro-pneumony; but the utmost discrimination should be exercised as to its amount and repetitions. In all cases, it should be employed early in the disease, and the quantity of blood taken away ought to be in due relation to the violence of the attack, to the age and constitution of the patient, and to the effects produced. In general, vascular depletion may be carried further in *pericarditis*, than in internal carditis, and in the complicated, than in the simple disease. The practitioner ought not to be deterred from bleeding by the weakness and smallness, or irregularity of the pulse, or by the faintness complained of; nor induced to carry it too far, by the palpitations, and inordinate impulse of the heart, and by the cupped and buffed state of the blood. If carditis be connected with rheumatism, this state of the coagulum will continue, although depletion be carried to inanition. I have seen it greatest in the blood last taken, where I was confident that the depletion had been carried to a very dangerous length. In these cases, the disease is partly in the blood itself; there is a redundancy of fibrine and albumen, and an increased disposition to their coagulation.

141. *B. Internal carditis*, unless when associated with pericarditis, is not so much benefited by very large bloodlettings, as may be supposed, although decided depletion, especially early in the disease, is required. M. BOUILLAUD thinks that this treatment should be carried further in endocarditis, than in pericarditis: but I differ from him in this; for the danger which he endeavours to avert by repeated venesections — and by them chiefly, if not solely — may be more certainly and safely prevented by the means about to be noticed, when prescribed after more moderate or less frequent depletions than he recommends. Besides, internal carditis sometimes occurs in cases where bloodletting had been previously and even copiously practised; as well as in others where it must be very cautiously and moderately resorted to. In all the forms of carditis, and particularly in pericarditis, it is often necessary to repeat the venesection oftener than once; but as often, after one moderate or copious venesection, cupping will be the best mode of abstracting blood. Indeed, a sufficient quantity may be taken away by this mode from the first, if the operation be properly performed. When the symptoms are severe, and the disease fully developed, the depletion should be prompt, copious, and *repeated* according to circumstances; but care ought to be taken not to defer the repetition of it until the recurring inflammation proceeds far: the least indication of unsubdued action, or the earliest sign of a return of the disease, requires that this means should be again cautiously resorted to, aided, however, by the remedies about to be noticed. In the circumstances under consideration, nervous excitement, or irritation, may be mistaken for unsubdued inflammatory action. This may become a dangerous, if not a fatal error; and acute observation and enlightened experience can alone guard against it.

142. *C.* After bloodletting, the rapid induction of the *mercurial action* is of the greatest importance. With this intention *calomel* should be given, every four or six hours, with *opium* and small doses of *tartarised antimony*, or James's powder, or with *colchicum* or *digitalis*. These medicines act beneficially, not only by abating the morbid action of the heart, but also by in-

ducing more rapidly the specific effects of the mercury. In the rheumatic forms of carditis, colchicum is extremely useful. It may be prescribed either with calomel, or with saline medicines, especially the alkaline carbonates. I agree with Dr. ROOTS in his recommendation, that patients should be kept long under the mercurial influence; and that a local depletion should be resorted to, whenever the symptoms become aggravated. When palpitations or nervous symptoms follow depletions and the production of the mercurial action, *camphor* (F. 373. 375. 555.), or *assafœtida* (F. 905.), or the decoction of *senega* (F. 74.), in moderate doses, will be found extremely useful in reducing the irregularity and the frequency of the heart's action. If the irritability of the heart still continue, these medicines may be given with *digitalis* (F. 574.), or with *hyoscyamus* (F. 460.), or with *opium* (F. 493.), or with the muriate or acetate of morphia (F. 537.), or with the *hydrocyanic acid*. This last has been strongly recommended by Dr. ELLIOTSON in such cases; and I have found it extremely useful. The extract or tincture of *hop*, either alone or conjoined with camphor, or with assafœtida, or with the compound galbanum pill, will also be found of service. Where it is still necessary to keep up the mercurial influence, the blue pill may be added to either of these. Anodyne *plasters* (F. 108. 117.) may also be applied over the sternum: those containing camphor and extract of *belladonna* (F. 112, 113.) will be found most beneficial. Anodyne *liniments* (F. 297. 313.) will likewise be useful, particularly when pain or irritability continues after the mercurial action is induced.

143. *D.* In the more *chronic* or *sub-acute* states of inflammation of either of the constituent tissues of the heart, the means already recommended should be prescribed according to the severity and peculiarities of the case. If effusion have taken place into the pericardium, or if excrescences, or other alterations, about the valves or orifices be presumed to exist, external derivatives, by *blisters*, repeated or kept open; by *moxas*, *setons*, or *issues*; by the tartarised *antimonial ointment*, or by *croton oil*, may be tried. These derivatives are most serviceable when directed to a part at a little distance from the region of the heart. The præcordia will thus remain free for the application of either of the plasters, or of the liniments recommended above (§ 142.), or of mercurial ointment with camphor. When, in these states of carditis, the action of the heart becomes inordinate, M. BOUILLAUD and some French physicians advise eight or ten grains of powdered digitalis to be sprinkled over the blistered surface. I have had no experience of this mode of employing digitalis. When, in addition to the irregular and excited action, there is more or less pain — a perverted state of sensibility following the morbid vascular action — ointments or embrocations containing the *narcotic alkaloids*, especially *veratria*, *delphinæa*, or *aconitine*, may be then tried, in the manner advised by Dr. TURNBULL. I have prescribed the first of these substances, in two or three cases of this kind; but, although it was not devoid of a certain degree of efficacy, it was not so beneficial as was anticipated from the praises bestowed upon it. In neuralgic affection of the heart, and in angina pectoris, the external use of these substances is sometimes productive of relief.*

144. *E.* When the inflammatory affections of the heart are *connected with arthritic or acute rheumatism* — in these especially, but also in other cases of carditis — a superabundance of fibrine or of albumen in the blood should be expected, and the disposition to its coagulation on the inflamed surface ought to be prevented as much as possible. The only means which I know, capable of fulfilling this intention, are — mercurials combined as above advised, particularly with colchicum or antimony; the spirits of turpentine given in drachm doses three times a day, until the kidneys become affected; the subborate or the subcarbonate of soda or of the other alkalies; and the hydriodate of potash. These, after vascular depletion has been employed sufficiently, will often be of service, especially if they be judiciously combined with sedatives or narcotics, and aided by external derivatives; substances of an acid nature being at the same time avoided. Bloodletting will rarely of itself remove altogether this or any other form of carditis, or change the morbid state of the blood, unless it be assisted by other means, more especially by those already mentioned.

145. *F.* When either of the forms of carditis supervenes in the course of *eruptive* or *continued fevers*, after having a cautious recourse to general or local depletion, the milder preparations of mercury in frequent doses until the mouth becomes affected, the alkaline subcarbonates, spirits of turpentine internally, or externally in the form of stupe or embrocation, mercurial liniments or ointments with camphor, &c., and external derivatives, are most to be depended upon. The action of the kidneys should also be promoted by conjoining these with anodynes, nitre, or the sweet spirits of nitre, digitalis, camphor, opium, &c., according to the peculiarities of the case; or by assiduously rubbing a stimulating *liniment* (F. 297. 311.) over the loins. If the inflammation affect chiefly the internal membrane of the heart, in the course of exanthematous or low fevers, or if it seem to have been induced by morbid or irritating matters in the circulation, vascular depletions must be employed with caution; in the latter of these circumstances, they will often be more injurious than beneficial. The other means, however, just recommended, particularly camphor, nitre, the alkaline subcarbonates, and opium, should not be neglected.

146. *G. Relapses* of carditis, especially of pericarditis, are very common, particularly when the

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* Dr. TURNBULL prescribes *veratria* and *delphinæa* in similar formulæ and in the same doses. He directs half a drachm of the alkaloid to be dissolved in a drachm of sweet oil, and made into an *ointment* with an ounce of prepared lard; — or a scruple of the alkaloid to be dissolved in two ounces of rectified spirit, for an *embrocation*; — or one grain in twelve pills, with extract of hyoscyamus, &c., one of which is to be taken every three hours. A small portion of the ointment, or of the embrocation, is to be rubbed over the præcordia, for ten or fifteen minutes, twice a day. He prescribes *aconitine* in similar formulæ to the foregoing; but he directs only sixteen grains, and eight grains of it, to the same quantity of ointment and spirit respectively. — Of the tincture of aconite (prepared from one pound of coarsely powdered aconite root macerated in two pounds of rectified spirit for seven days), he gives four or five drops three times a day; and employs it also externally.

patient relinquishes medical and moral treatment, before the morbid condition is entirely removed and the functions of the organ entirely restored, or when the inflammation has left more or less alteration of structure, or when the mercurial influence has been imperfect, of too short duration, or suddenly terminated. This influence should therefore be exerted fully, continued for some time — not less than two or three weeks — and allowed gradually to subside. In cases of relapse, the large depletions, often required in a first attack, are frequently hazardous. Local bleedings and a moderate use of mercury are generally sufficient. Relapses are usually of a sub-acute or chronic form, and are often merely exacerbations of unsubdued disorder, or inflammatory action superinduced in parts already altered in structure as well as impaired in function. Hence these remedies should be prescribed with more precaution and restriction than in first attacks.

147. External derivatives employed so as to produce a permanent effect, are usually of service in relapses, as in the chronic states of the disease. Blisters should be repeated, or kept open; but they should not be applied immediately over or too near the heart, nor longer than to produce redness or incipient vesication. The part ought then to be covered by a warm bread-and-water poultice, which ought to be several times renewed. The irritating effects produced on the circulation by the absorption of the cantharides will thus be in some measure prevented. Other means of derivation are often preferable to blisters, especially tartarised antimonial ointments or plasters; or warm turpentine stupes, embrocations, or liniments; but the former of these, as well as setons and issues, should be directed at some distance from the inflamed organ. If these occasion constitutional irritation or debility, they should be relinquished; or anodynes may be given with gentle tonics, as the tincture or extract of hop with camphor or assafœtida, or the medicines of this kind already advised (§ 142.), may be prescribed, in combinations according to circumstances. — The diet should be light and moderately nutritious.

148. *H.* In the different states of carditis, the bowels must be kept moderately open by *mild* and *cooling purgatives*, but severe purging ought to be avoided. The functions of the other excreting organs should also be promoted. The urine especially ought to receive attention, both as to quantity and quality. If it abound with acid, as generally observed in the rheumatic complications, the alkalies, or the subborate of soda, may be given in large doses, with colchicum, camphor, digitalis, or hyoscyamus, &c. The states of the stomach and liver require careful regulation; and the redundancy of excrementitious matters in the blood must be prevented by promoting the free action of all the emunctories.

149. *I.* The *diet* and *regimen* should be strictly antiphlogistic in the more acute states of the disease. As these pass away, or lapse into more chronic forms, bland, mucilaginous or farinaceous articles of food, according to the circumstances of the case, may be allowed; but even these ought to be given sparingly until convalescence is established. In the more chronic cases, or after relapses, the diet may be more nutritious, light animal food and broths being allowed in moderate quantity. Still the principal part of the diet ought to be chiefly farinaceous; and all exciting or heating beverages must be avoided. During the different forms and complications of carditis, perfect repose, mental and physical, ought to be preserved. The patient's *drink*, in acute or first attacks especially, should be emollient and cooling. A weak decoction of marsh mallows, or of barley, or of liquorice root, or mucilaginous fluids containing small quantities of the nitrate of potash, and the subcarbonate of soda, or the subborate of soda, will be found generally appropriate. Beverages containing an acid should be avoided.

150. x. OF INFLAMMATIONS OF THE HEART IN CHILDREN. — *A. Internal Carditis* is sometimes met with in *children* — most frequently after small-pox, scarlatina, pneumonia, hooping-cough, and measles: but it occasionally also appears as a primary affection. It is often connected with articular rheumatism, or complicated with pneumonia or pertussis. I have observed it to attend, in its more acute states, the secondary fever of small-pox, but it more commonly appears during convalescence from these eruptive diseases. It is generally insidious in its attack and early progress. The pulse becomes quick, irritable, small, and irregular. Cough, without expectoration, or increase of pain, is sometimes present. The sounds of the heart are extended, and the pulsations are indistinct or tumultuous, or run into one another. Breathing is short or hurried, especially on any exertion. A heavy pain or aching, or soreness is felt under the sternum, and to the left side. The jugular veins often pulsate; the face is anxious; the hands become hot in the evening, and the child cannot preserve the horizontal posture in bed. Still it walks about, appears only much out of health, is short-breathed, irritable, and very delicate. On auscultation, a blowing or bellows sound is generally heard more or less distinctly. At last hypertrophy, with dilatation of the heart, becomes manifest, and all its consequences.

151. *B. Pericarditis* is a much more common disease in children than is generally supposed. I have met with it often, both in its simple and complicated forms; and at all the epochs of childhood — from three or four years and upwards. It is frequently associated with endocarditis, and true carditis, and with pleuritis or pleuro-pneumony. In the latter complications, it often proceeds to a fatal issue, without having been recognised during life, it having been masked with the pulmonary affection. Most commonly, however, it is connected with acute arthritic rheumatism; and in this case there may exist also internal carditis, and diaphragmatic or pulmonary pleuritis.

152. *C.* The *Causes* of pericarditis in children, are nearly the same as in adults. I have observed the disease chiefly in children who live in low cellars, and in ground floors, and are much exposed to cold and humidity, especially if they be imperfectly clothed, and ill-fed. It is from these causes principally that articular rheumatism, with which the different forms of carditis are generally associated in children, also arises. Pericarditis is often occasioned by exanthematous fevers, and by inflammations of the lungs or pleura; or it follows these diseases, most pro-

bably, in consequence of exposure to cold, or to vicissitudes of temperature during convalescence from them. It is extremely rare to meet with articular rheumatism in persons under puberty, and especially in children, unconnected with external or internal carditis, or even with both. The *Symptoms* of pericarditis in children, and the structural lesions produced by it, as well as those consequent upon endocarditis, differ in no respect from the history given of them in adults.

153. *D.* The *Treatment* of inflammation of the heart in children should be strictly and actively antiphlogistic, at an early stage. Decided local depletions, the exhibition of calomel or other mercurials with colchicum, or antimonials, or other anodynes; mild purgatives, external derivatives, perfect repose, and a bland low diet, with the emollient and alkaline drinks already prescribed; are the chief means of cure.*

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* On referring to my note-book, for cases of pericarditis in children, I find that, in those from five to seven years of age, the following was the treatment most commonly prescribed. All these cases were connected with articular rheumatism. — After cupping or applying leeches over the sternum, according to the age and strength of the child, a powder, consisting of three grains of calomel, and one of James's powder, was directed to be taken three times a day, and continued till the gums were affected. This mixture was also prescribed, and the effects of both carefully observed: —

No. 252. — ℞ Mist. Camphoræ ℥ iij.; Liq. Ammon. Acet. ℥j.; Vini Antimonii Tart. ʒ ss.; Tinct. Sem. Colchici ♏ xxv.—xxx.; Syrup. Tolutan. ʒj. M. Fiat Mist., cujus capiat Coch. ij. minima, tertiâ vel quartâ quâque horâ.

Blisters were generally directed to the right side of the chest, with the precautions above enforced (§ 147.); and where there appeared a tendency to effusion into the pericardium, the following was sometimes directed: —

No. 253. — ℞ Mist. Camphoræ, Aq. Fœniculi, āā ℥ jss.; Liq. Ammoniæ Acetatis ℥ j.; Potassæ Acetatis ʒ ijss.; Spirit. Æther. Nit. ʒ j.; Tinct. Digitalis ♏ xxv.; Tinct. Scillæ ʒ ss. M. Fiat Mist., cujus capiat Coch. i. medium, quartis horis.

If the internal surface of the heart seemed to be inflamed, after the remedies already noticed, the following was often employed: —

No. 254. — Mist. Camphoræ ℥ ivss.; Potassæ Nitratis ℈ ij.; Sodæ Sub-carbon. ʒ j. (vel Sodæ Sub-boratis ʒ ss.); Spirit. Ætheris Nit. ʒ jss.; Tinct. Digitalis ♏ xx.—xxx.; Syrup. Papaveris ʒj. M. Fiat Mist., cujus capiat Coch. ij. minima, vel j. medium, quater in die.

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V.—Of Structural Lesions of the Heart and Pericardium.

Classif. — IV. Class, II. Order (*Author*, in *Preface*).

154. Defin. — *Alterations of one or more of the constituent tissues or compartments of the heart, generally arising from previous local or constitutional disease, and occasioning more or less obvious lesions of related organs.*

155. This class of diseases of the heart might, according to the definition just given, have comprised several alterations of structure which have been already considered. But, as these alterations more immediately proceed from inflammatory action, they have been noticed under the head of inflammations of this organ. The lesions, however, which remain to be described, do not depend alone upon either of the chief pathological states already discussed. They are no more the consequences of inflammation, than they are of altered nervous power. Indeed, they may even occur without any evidence of either morbid condition having existed, although they often more remotely result from certain combinations or forms of these conditions. The only inference that can be drawn from a minute examination of a large proportion of them is, that the organic nervous influence, and, consequently, that the states of vascular action and of the circulating fluids, have been altered in such a manner as to have affected the nutrition of one or more of the constituent structures of the heart, or to have given rise to preternatural and adventitious productions in that organ. (See art. Disease, § 93. *et seq.*) In the consideration of the structural lesions of the heart, I shall notice, in the *first* place, those which seem to be the simplest in their nature, and in respect of the morbid conditions out of which they arise; and subsequently those which depend upon more complicated pathological states.

i. Hypertrophy of the Heart. — *Increase of the Muscular Tissue of the Heart.*

156. Defin. — *Augmentation of the muscular substance of the organ, resulting from increased nutrition, and this from excited action.*

157. *A. Description.* — Although Diemerbroeck, Bartholin, Lancisi, Morgagni, Senac, Borsieri, Corvisart, and others, had described, more or less fully, hypertrophy *with* dilatation, and had even noticed the simple form of hypertrophy, or that *without* dilatation, yet it was not until 1811 that the different varieties of the lesion under consideration were fully investigated. In that year M. Bertin described the several forms of hypertrophy with an accuracy fully confirmed by the subsequent researches of Laennec, Elliotson, Hope, and Bouillaud.— M. Bertin considered hypertrophy nearly as follows: — 1st, *Simple hypertrophy*; the parietes of the compartments being thickened, the cavities retaining their natural dimensions; — 2d, *Hypertrophy with dilatation*; the cavities being increased in capacity, and their parietes either of natural or of augmented thickness; the *Active Aneurism* of Corvisart, and the *Excentric, or Aneurismal Hypertrophy* of Bertin; — 3d, *Hypertrophy with diminution of the cavities*; the *Concentric Hypertrophy* of Bertin.

158. The *second* of these, or *hypertrophy with dilatation*, is the most common. It presents two varieties: — (*a*) That in which the walls of one or more compartments are thickened, and the cavity dilated; — (*b*) That with the walls of natural thickness and the cavity dilated, or *hypertrophy with increased extent of the walls* (Hope). In this latter variety there must necessarily be augmentation of the muscular structure, otherwise the dilatation would be attended by thinning of the parietes. — The *third* of the above forms of hypertrophy is the next in frequency; and the *first* is the least common. For twenty cases of the second form of this lesion, not more than one is observed of the first. A thick parietes and a small cavity of either of the ventricles do not of themselves constitute concentric hypertrophy; for a violent contraction at the time of death may have produced this state. But in this case the bulk of the part would be proportionately lessened. To constitute, therefore, this form of hypertrophy, the parietes should not only be thickened, and the cavity be diminished, but the bulk should either be natural, or greater than natural. In this and the simple hypertrophy of the left ventricle, the thickness is sometimes

double, or even triple, what is natural. BOUILLAUD thinks that the concentric hypertrophy is more frequent and greater in the right than in the left ventricle; and adduces a case from BERTIN, where the parietes of the right ventricle were increased to sixteen lines; a thickness never observed in concentric hypertrophy of the left, although a less degree of thickening is oftener observed in the latter.

159. M. BOUILLAUD adduces several instances of hypertrophy with extreme *dilatation*. In one, the left ventricle could contain the closed hand. In another, the right ventricle could admit a goose's egg; whilst the left could contain the closed hand of a female. In a third, the right auricle of a child of seven years was filled with a coagulum as large as the hand of an adult. In concentric hypertrophy, the cavities of the ventricles, especially of the right, may be *diminished* so as hardly to admit the thumb, or a pigeon's egg. LOUIS and BOUILLAUD have observed the cavity of the right ventricle even less than this. The columnæ carneæ generally participate in this form of hypertrophy, and thereby tend to diminish the cavity. In this ventricle especially, they are often remarkably thickened and interlaced; and they may even subdivide the cavity, or traverse it, or be so hypertrophied as nearly to fill it (BERTIN, BOUILLAUD, and HOPE).

160. Hypertrophy may be limited to a single compartment, or it may extend to two or more; and even, although rarely, to the whole organ. It is, in all its forms, more frequently observed in the ventricles than in the auricles, as the former are most obnoxious to the exciting causes (§ 165.). In some instances, one cavity is thickened, whilst another is attenuated. When hypertrophy with dilatation extends to all the compartments, the heart is often enlarged to three or four times its natural size. It then usually assumes a globular form, the apex being nearly effaced; and it lies transversely in the thorax, the diaphragm turning it in this position, and considerably to the left. It also rises high in the chest, and pushes up, and presses upon, the lung of the left side. The situation of the greatest thickening is usually above the middle of the ventricles, where the fleshy columns take their origin; but an irregular form of hypertrophy is occasionally seen. The interventricular septum is not so often thickened as the external parietes. — Hypertrophy may be confined not only to a single ventricle, but even to a part of it, as the base, the apex, the fleshy columns, or the external walls; the rest of the compartments being either natural or thinned. A ventricle may also be contracted in one part, and dilated in another; but these latter alterations are comparatively rare. It is obvious that the heart will vary in its external form, according as the hypertrophy is confined to one compartment, or is extended to two or more, or as either form of this lesion predominates. When there is great dilatation, the fleshy columns are often stretched, flattened, or attenuated.

161. Hypertrophy of the auricles is generally attended by dilatation, the simple and concentric forms being very rarely observed in them — so rarely that LAENNEC does not appear to have met with these forms in this situation. The musculi pectinati are more enlarged than any other parts of the parietes of the auricles; and sometimes they alone are hypertrophied. Dr, HOPE remarks, that as the musculi pectinati are larger and more numerous in the right than in the left auricle, it is in the former that the thickening proceeds to the greatest extent; the right auricle being thereby rendered nearly as thick as the right ventricle (§ 9.).

162. *B. The Nature and Causes of Hypertrophy.* — The hypertrophied muscular tissue of the heart is generally of a livelier red hue than the natural structure, and at the same time firmer and more elastic. This circumstance, in connection with that of hypertrophy sometimes following inflammation of the external and internal membranes, and being even occasionally associated with inflammation of the internal surface of the aorta, has induced some pathologists — especially BERTIN, BOUILLAUD, ANDRAL, and ELLIOTSON — to refer this lesion to inflammatory action; and they have considered the accompanying pain and sense of heat in the cardiac region occasionally complained of, the absence of any obstacle to the circulation in some cases, and the not infrequent complication of it with more or less recent inflammatory products on one or other of the surfaces, or with increased vascular injection, as proofs of this origin. M. BERTIN quotes, in support of this view, the experiments of M. CHEVALIER, who found, on comparing an hypertrophied ventricle with a healthy specimen, under the microscope, that the fibres of the former were much redder than those of the latter; and that, on steeping a portion of each in separate quantities of distilled water, the hypertrophied portion reddened the water more than the other, and when taken out was still the redder of the two. On being put in boiling alcohol, it was found to contain less fatty matter. On this point, which is one of some importance as regards the treatment, the writers just named contend that, although it may be considered that this lesion is most frequently produced by obstruction in the opening leading from the hypertrophied cavity, and depends upon increased muscular efforts to carry on the circulation through it, occasioning an increased circulation in the nutrient vessels, and hence augmented nutrition of the part; and although this undoubtedly obtains to a great extent, and amounts very nearly to one form of inflammation — to inflammation with a developement of the formative process; yet hypertrophy does not always depend upon such obstruction; and even when it does, it may be considered not the less inflammatory, inasmuch as the obstruction, whether in the valves or in the state of the orifices, is almost always a result of, or an attendant upon, inflammation; the obstruction, as well as the hypertrophy, proceeding from the presence or continuance of increased vascular action, especially of the nutrient vessels.

163. Notwithstanding these arguments, hypertrophy of the muscular tissue does not appear to be the immediate result of inflammatory action, although it is generally consequent upon the changes produced by this state of action, and is often associated with it in the other constituent tissues of the heart. Indeed, it is not unusual for inflammation to occur in these tissues in the course of hypertrophy. Admitting that the obstruction to the circulation, productive of enlargement of one or more of the compartments, is not

always seated at their openings, yet the inordinate action either caused by nervous excitement long continued and by inflammatory irritation of the internal membrane, or required to overcome the impediments occasioned by false membranes and by adhesions of the pericardium, may so develope the muscular structure of a part, or the whole of the organ, as to constitute a very remarkable degree of hypertrophy, although the orifices are unobstructed. If the opinion I have contended for above (§ 6.),—that the heart possesses a power of active dilatation, as well as of active contraction,—be admitted, the circumstance of causes which impede the dilatation of one or more of the cavities being attended by hypertrophy will be readily explained; and one of the arguments in favour of the opposite doctrine disposed of. When this lesion is seated in the ventricles, especially in the right, it is occasioned, perhaps, as frequently by these causes, as by any obstacle to the onward current of the circulation. The increased firmness and elasticity of the hypertrophied structure is an additional evidence that this lesion is not in itself inflammatory; for it presents neither the friability and softening, nor the induration and morbid colour, observed to follow inflammation.

164. Viewing, therefore, hypertrophy of the heart as the result of augmented nutrition consequent upon increased exercise of the muscular structure, the increased exertion requiring, and hence inducing, a more active state of the circulation in this structure, it follows, that whatever occasions this increase will, if long continued, give rise to this lesion, in some one or other of its forms, especially in young, sanguine, or plethoric persons, or whilst the powers of life are unimpaired. Whatever excites the nervous influence of the heart, so as to produce long-continued palpitation, or demands from the organ a greater power, either of contraction or of dilatation, will produce it, particularly in the compartments having a more direct relation to such exciting cause. The more *remote causes*, therefore, of hypertrophy may be divided into — 1st. Those which act directly upon the nervous influence of the heart; — 2d. Those which impede the onward current of the blood, and thereby occasion reaction of the muscular structure, in order to overcome the distending or opposing fluid; — and, 3d. Those which encumber the muscular actions of the organ, and render either the contractions or the dilatations of its cavities more difficult, and require a more energetic exertion of these actions, than natural. It must not, however, be supposed, that the causes belonging to either of these orders produce the effect singly. Two or more of them, although belonging to different orders, often act in unison in producing this lesion.

165. *a.* The *exciting causes* which act primarily upon the nervous influence of the organ are — all the moral emotions, the other causes shown above to produce palpitation (§ 45, 46.), and the physical agents which occasion increased circulation. Protracted muscular exertion, by returning the blood to the heart with great rapidity or force; a stimulating and rich diet, by exciting the heart, and at the same time loading it with a rich blood; and the abuse of spirituous and intoxicating liquors; are often more or less directly concerned in the production of this lesion, although other causes frequently co-operate with them. — *b.* The causes which produce reaction by obstructing the circulation are chiefly mechanical, as the alterations in the orifices and valves already described (§ 66, 67.); contractions, dilatations, and aneurisms at the commencement of the arterial trunks — especially the aorta; congestion of the lungs, or interrupted circulation through them, from disease of their substance, or of the bronchial tubes, or of the pleura, or from emphysema, and from the accumulation of fluids in the pleural cavities; the frequent recurrence of spasmodic and convulsive affections, particularly asthma and hooping cough; and whatever impedes the circulation in the aorta, vena cava, and principal vessels immediately connected with them, as wearing strait corsets, the gravid uterus, and large tumours. Under this head, also, may be mentioned, insufficiency of auriculo-ventricular valves, either from atrophy or contraction of them, or from dilatation of the orifices. Contractions of these orifices, or obstructions caused by adhesions of, or excrescences upon, the valves, will occasion hypertrophy not only of the auricles, but also of the ventricles — of the auricles, from the obstruction at their outlets, and the consequent distension of their cavities; of the ventricles, from the augmented force of dilatation required to fill them; the concentric form of hypertrophy depending chiefly upon this latter cause. — Of the other causes of hypertrophy it is unnecessary to make particular mention, as they are of less frequent occurrence, and do not differ materially from those already noticed in connection with excited action (§ 19. 45.) and inflammations (§ 126.) of the heart.

166. It may be stated in general terms, that the same causes and lesions of structure which occasion *thickening* of the parietes of a compartment, or thickening with dilatation, will produce in other persons simple *dilatation*, or dilatation with *attenuation* of the parietes. The alterations of the thickness of the walls, as well as of the capacities of the cavities, seem to depend very much upon the the states of vital energy and resistance, and of nutrition. In young and robust persons, thickening of the walls, with or without dilatation of the cavities, of one or more of the compartments will most likely occur; whereas in the delicate, the lymphatic, or leucophlegmatic, in the ill-fed, and in those either advanced in life, or exhausted by previous disease, dilatation, or dilatation with attenuation of the parietes, of one or more of the chambers, will most probably take place; but much also will depend upon the nature of the obstruction or cause out of which the hypertrophy or dilatation arises. Where the obstruction to be overcome is relatively greater than the power of the organ to overcome it, dilatation of the cavity more frequently takes place, than thickening of the walls of that cavity; and where the obstruction is *before* the hypertrophied cavity, more or less dilatation is usually observed; the degree of thickening or of attenuation of the parietes depending upon the states of vital power and of nutrition as just stated. Where, however, the obstruction is *behind* the hypertrophied compartment, thickening of its walls, with or without diminution of its cavity, is the common attendant.

— When the cause of hypertrophy is regurgitation of blood into the cavity, owing to insufficiency of the valves at the outlet, there is generally more or less dilatation; but there may be either thickening or attenuation of the walls, according to the states of vital energy and nutrition. — Where there is actual thickening of the muscular substance, the coronary arteries are found proportionally enlarged, indicating a greater activity of the vital and nutritive actions of the organ. — Dr. Hope considers, that, when hypertrophy is connected with an obstruction *behind* it, the alteration is owing to the retarded circulation in the veins which is propagated through the capillaries to the arterial system, and ultimately to the heart. He thus explains the occurrence of hypertrophy of the left ventricle, when the mitral orifice is contracted. But the active efforts made to fill the ventricle seem to me to be the cause of this association of hypertrophy (§ 165.); for it is often observed, where the extreme venous congestions to which Dr. Hope's mode of accounting for it would necessarily give rise, are not met with.

167. *C. The Complications of Hypertrophy of the Heart* are principally those morbid conditions, of which the enlargement is a frequent consequence, particularly those just mentioned (§ 165.), and chronic inflammations of the internal and external surfaces of the organ. These latter lesions, as well as disease of the orifices and valves, not only give rise to hypertrophy, but also often complicate it during its future course. When inflammatory irritation is induced in the internal membrane of the cavities, excited action of the muscular structure is the usual consequence; and when this is long kept up, hypertrophy will follow to a greater or less extent. When pericarditis is followed by adhesions or by false membranes, thickening of the walls of the compartments will also sometimes result. The increased action required, in this encumbered state of the organ, in order to keep up the circulation, developing and augmenting the muscular structure of one or more of the compartments. In these cases, additional lesions are often observed, particularly of the valves and orifices; and adhesions of the pericardium to the pleura, or other alterations of the collatitious viscera, frequently also exist.

168. Nothing is so common as to find one or more of the above changes of the internal and external surfaces of the heart complicated with hypertrophy. M. Bouillaud remarks, that, when inflammation of the external, and especially of the internal, sero-fibrous tissue of the organ has become chronic, hypertrophy of the muscular structure is sure to follow. Of thirty-three cases, which he records, of pericarditis and endocarditis that terminated in thickening and induration, there was not one in which there was not also hypertrophy. Indeed, this latter lesion may be associated with any of the alterations to which the pericardium and heart are liable, or even with several of them; and it may be, moreover, complicated with various changes of the arterial system, especially cartilaginous, osseous, and albuminous productions (see arts. Apoplexy, § 96.; and Arteries, § 38. *et seq.*), aneurisms, &c.; or with congestions of related organs, particularly of the lungs, the brain, and the liver; or with effusion of serum into shut cavities, or into the cellular tissue; or with hæmorrhages from mucous surfaces, or into the substance of the larger organs, as the brain, lungs, liver, &c.

169. *D. Of the Influence of Hypertrophy, &c. of the Heart upon Cerebral and Pulmonary Hæmorrhage.*—It is unnecessary to add much to the remarks already offered on this subject, in the articles Apoplexy (§ 96.), and Hæmorrhage with it require to be considered at this place.—*a.* (§ 30. 107. 115.); but certain points connected *Cerebral hæmorrhage* is probably a more frequent consequence of cardiac disease, than pulmonary hæmorrhage, but facts are wanting to determine to what extent it is so. That it is more common is shown by Bertin and Bouillaud; and it may partly be accounted for by the fact of disease of the pulmonary arteries being much less common than alterations of the cerebral vessels. That an intimate connection often exists between the occurrence of apoplexy and palsy, and antecedent disease of the heart, is now fully established, although doubts are still entertained by some as to the nature of the connection. As long ago as 1822, and 1823, I discussed this question (*Lond. Med. Repos.* vols. xviii. p. 149., and xix. p. 17.), and in the article Apoplexy (published Sept. 1832), the results of my inquiries were again stated. The occasional dependence of cerebral hæmorrhage on disease of the heart was first remarked by Baglivi, who observed it in the case of Malpighi, who died apoplectic after palpitations caused by structural change of the heart. It was only incidentally mentioned by Morgagni and Lieutaud; and not insisted on in the relation of cause or effect, until M. Richerand treated of it in his account of the case of Cabanis, in whom this complication was found. Portal, Testa, and Sprengel soon afterwards expressed the same opinions as Richerand; and Rossi met with this association of disease in the case of the Crown Prince of Sweden. The frequent connection between cerebral hæmorrhage and disease of the heart has been shown, in this country, by Hutchinson, Abercrombie, Craigie, Johnson, Hope, Watson, and myself; and in France, by Bricheteau, Lallemand, Bertin, Cruveilhier, Broussais, Andral, and Bouillaud; and the effect upon the brain has been too exclusively limited to hæmorrhage, and too generally imputed to hypertrophy of the left ventricle. There is, however, every reason to believe that softening of the brain, congestions of the veins and sinuses, and serous effusions into the ventricles or between the membranes, occasionally also proceed from cardiac disease, especially when it causes obstructed circulation through the right side of the heart; and that cerebral hæmorrhage may sometimes depend upon the lesions in this situation, as suggested in the articles referred to.

170. M. Bricheteau has very recently investigated this subject at some length; but he has insisted chiefly upon the influence of hypertrophy of the left ventricle in the production of hæmorrhage in the brain. He has, however, remarked, that other changes within the head besides this may result from this cause, especially determination of blood to the brain, mental disorder, serous effusion, brain fevers, &c. He observes, that when hypertrophy is accompanied with other

lesions of the heart, particularly with such as impede the free egress of the blood from the left ventricle, as disease of the aortic orifice, the symptoms of cerebral disorder are then much less conspicuous; and that dyspnœa, tendency to syncope, and dropsical effusions, are more marked. — M. Bouillaud found, out of fifty-four cases of hypertrophy, in some of which the right ventricle only was affected, and the left one not at all, or very little so, that there were eleven with cerebral disease, six with apoplexy, and five with softening of the brain. In five of these eleven, the cerebral arteries were ossified or cretaceous at one or more points. In six of these cases, the hypertrophy of the left ventricle was *excentric*, in three it was *concentric*, and in two *simple*.

171. Dr. Watson (*Lond. Med. Gaz.* April 6. 1835.) has made some very judicious remarks upon this subject; but in all the material points, particularly in the explanation of the connection between diseases of the heart and brain, he has been anticipated by the observations I have offered both in the papers referred to above, and in the article Apoplexy (§ 96.), where I have succinctly given the results of my own investigations. The views there entertained, as Dr. J. Johnson has done me the justice of stating (*Med. Chirurg. Review*, April, 1836, p. 512.), in an able inquiry into this subject, are fully confirmed by his own experience, and by the more recently published researches of MM. Bouillaud, Bricheteau, and others. — As the paragraph referred to in the article Apoplexy has so fully and completely anticipated the results, at which subsequent writers on this subject have arrived, I have only to request the reader to turn to it, especially as I have nothing further to add to it.

172. *b. The influence of cardiac disease on pulmonary hæmorrhage* has also been adverted to in the article Hæmorrhage (§ 30. 115.), M. Bouillaud found this form of hæmorrhage less frequently to arise from lesions of the heart, than that just noticed. He has adduced only three instances in which it seemed to depend upon hypertrophy of the right ventricle. And M. Bertin, whilst he admits the occasional connection between pulmonary apoplexy and hypertrophy in this situation, considers it not common. A more intimate and more frequent dependence of the former on the latter has recently been contended for by M. Bricheteau. A different view of the connection between pulmonary hæmorrhage and cardiac disease has been lately entertained by Dr. Wilson and Dr. Watson, particularly the latter. The dependence of dropsical effusions within the chest upon organic lesions in the left side of the heart, has been long known; but the connection between hæmorrhage from the respiratory surfaces, and these lesions, had been entirely overlooked. Mr. A. Burns seems to have been the first who took a judicious view of the subject. He observes, that the pulmonic vessels, by the congestion occasioned by cardiac disease, and the continued *vis à tergo*, are ruptured; the blood being forced into the air-cells, or into the cellular structure of the lungs, until this organ appears like liver, or sinks in water. Dr. Watson has very fully shown that the pulmonary hæmorrhage rarely depends upon hypertrophy of the right ventricle, but chiefly upon narrowing of the left auriculo-ventricular orifice, or rigidity of the mitral valve. Indeed, hypertrophy of the right ventricle seldom exists without disease at the origin of the pulmonary artery sufficient to counteract the increased action of the ventricle. It is, therefore, the obstructed return of blood from the lungs, and but rarely the increased impetus occasioned by the hypertrophied right ventricle, that causes any of the forms of pulmonary Hæmorrhage (§ 107. 115.). M. Bertin admits the influence of narrowing of the left auriculo-ventricular orifice in the production of hæmorrhage into the lungs, and considers the hæmorrhage thus caused to be of a more gradual and passive kind, than that produced by hypertrophy of the right ventricle. Dr. Townsend (*Cyclop. of Pract. Med.* vol. i. p. 138.), states, that of twenty-two cases of pulmonary apoplexy examined by him, more than two thirds occurred in persons whose hearts were diseased, and in two only of these was the hæmorrhage connected with tubercles; but he has neglected to assign the particular lesions of the heart observed in these cases. The very frequent dependence of pulmonary apoplexy on cardiac disease has been insisted upon, also, by Chomel, Andral, Cruveilhier, Bouillaud, Hope, and others; but with a great want of precision as respects the seat and nature of the primary malady. That cases sometimes occur, in which hypertrophy of the right ventricle is associated with narrowing of the left auriculo-ventricular orifice, in the production of pulmonary hæmorrhage, is shown by an interesting case recorded by Dr. Law (*Cyclop. of Pract. Med.* vol. ii. p. 403.). A young lady had repeated hæmoptysis, with palpitations, which were more frequent and profuse until death. Both lungs were found engorged with blood, &c. The right ventricle was hypertrophied and dilated; the left auricle dilated and thickened; the left auriculo-ventricular orifice contracted so as hardly to admit a quill; and the left ventricle contracted. The pulmonary artery was dilated and thickened; the aorta was smaller than natural. In this case the congestion of the lungs, consequent upon obstructed circulation through the left side of the heart, had not only caused hæmorrhage, but also hypertrophy, of the right ventricle.

173. It is, moreover, very probable, as I have stated in the article Hæmorrhage (§ 115.), that when the more powerful moral emotions are productive of hæmoptysis, this effect is owing as often to their impeding the circulation through the *left* side of the heart, as to their exciting the action of the right ventricle; and that, when the same emotions occasion apoplexy, palsy, or any other cerebral disease, they act as frequently by interrupting the current through the *right* side, as by inducing inordinate action or hypertrophy of the left ventricle. — It is, however, to be presumed, that the opposite passions produce opposite effects upon the heart, and that, whilst terror, fear, grief, anxiety, and other depressing passions impede the circulation through this organ, and cause congestion of its cavities, thereby favouring the occurrence of hæmorrhagic or serous effusions, either in the head or in the chest, the exciting passions, as anger, desire, revenge, &c., accelerate and increase the force of the circu-

lation, by exciting the actions of the ventricles. From this it will appear, that the same class of emotions may induce effusion into either the brain or lungs, according to the predisposition or previous state, functional or structural, of these organs, and to the side of the heart chiefly affected by them; and that, whilst the depressing passions act by interrupting the circulation through the heart, and consequently by impeding the return of blood from these parts, the exciting emotions operate by increasing the frequency and power of the ventricular contractions, and by propelling the blood with greater force into these organs.

170. E. *Symptoms and Diagnosis of Hypertrophy of the Heart.* — a. *The local signs* consist chiefly of a permanent increase of the force of the heart's contractions, of the sphere within which they are perceived, and of the double sounds attending them. These signs — the permanently increased force, extent, and sounds of the heart's actions — are always present; but they vary considerably, and are attended by other phenomena — commonly by an increased extent of dulness on percussion in the cardiac region, and often by some degree of prominence of this part, particularly in young persons. — Where hypertrophy is considerable, the movements of the heart are visible in a large extent of the left side of the chest, and towards the pit of the stomach, and often through the clothes. The apex of the heart is felt more to the left, and generally at the sixth, seventh, or eighth intercostal space, whilst the base corresponds with the third, or even the second intercostal space. — On applying the hand upon the cardiac region, a stronger, a more extensive, and longer enduring *impulse* or *shock* is felt, consisting not only in the striking of the apex, but also in the pushing of the ventricle against the ribs, as the latter swells in each contraction. In these cases, the head, or stethoscope, on auscultation, is raised by the force of the impulse. The first *sound* is generally prolonged and duller than natural; and the more so, the greater the hypertrophy or thickening of the ventricle. But when the thickening is moderate, and the cavity is somewhat dilated, the sounds are stronger and clearer than natural, and heard over a more extended sphere. When the thickening is very great, and the cavity diminished, the sounds become nearly or altogether imperceptible. In simple hypertrophy, the sounds are not usually otherwise morbid; but when there is disease of the valves, then the sounds characteristic of this disease are heard.

175. In proportion as *dilatation* is great, the impulse is slighter, brisker, and lower than natural; and the first sound is louder, clearer, and of shorter duration. The greater the thickening of the walls, the duller are the sounds, compared with the force of the shock or impulse; and the greater the dilatation of the ventricular cavities, and attenuation of their parietes, the clearer, louder, and shorter are the sounds, in relation to the force of the impulse; which, in cases of great dilatation, is much less than natural. Where the enlargement consists chiefly of dilatation, as well as where thickening predominates, the sounds will be otherwise altered, according to associated disease of the valves or orifices of the organ. — In *hypertrophy* with slight dilatation, as Dr. Williams remarks, there is a strong heaving impulse, with an abrupt collapse, or back stroke, and a prolonged, diffused, but not clear sound. — In *dilatation* with slight hypertrophy, the sound is loud, commencing abruptly, and heard over a large space; whilst the impulse is unnaturally great only when the heart is excited, as in palpitation, when it produces hard, abrupt, and circumscribed blows, without heaving. The palpitations attending hypertrophy will be violent and heaving, when the thickening predominates; but noisy, fluttering, and accompanied with a feeling of faintness, when dilatation is the chief lesion.

176. Cardiac hypertrophy is seldom accompanied with *pain*; but when it is considerable, or very great, a sensation of uneasiness, of weight, or of anxiety, is often felt in the præcordia, or at the epigastrium. *Dulness* on percussion is in relation to the extent of hypertrophy and dilatation, and is observed to extend downwards and towards the left side, owing to the explanation given above (§ 160.), unless when the heart is confined by adhesions. *Prominence* of the cardiac region is not uncommon when the hypertrophy is great. Bouillaud has directed particular attention to this sign; but it has been incidentally noticed by others.

177. b. *The general or rational symptoms* vary much with the form of hypertrophy, and with the other lesions of the heart with which this is associated. — The *pulse* in simple and excentric hypertrophy is generally strong, large, full, vibrating, and free; but it is small or oppressed in the concentric variety. When there is also disease of the left orifices and valves, the pulse is weak, small, or otherwise affected. Where the hypertrophy is simple, the face and general surface are animated, the animal heat is developed, and a tendency to active hæmorrhage sometimes observed. The venous circulation is also unimpeded, and neither sanguineous nor serous congestions or effusions take place. But when the hypertrophy is complicated with lesions, interrupting the passage of the blood through the heart, the pulse is weak, small, and irregular; congestions or effusions of blood, and dropsical infiltrations and collections, being common results. — *Respiration* is but little disturbed as long as the hypertrophy is moderate and simple. But when it is excessive, it then encroaches on the lungs, and causes *dyspnœa*; and, as this state is usually a consequence of impeded passage of blood in the heart, causing congestion of the lungs, or serous infiltration of their substance, the dyspnœa is principally owing to these circumstances. Indeed, the majority of sympathetic phenomena, observed in connection with hypertrophy, are no further dependent upon this lesion than that they result from the same alterations as it. — *Cough* is seldom present in the early stages, especially when the hypertrophy is confined to the left ventricle; but when sanguineous or serous congestion supervenes in the lungs, this symptom is commonly observed. — *Œdema* occurs when the hypertrophy is very considerable, and is attended by dilatation. It often appears first in the eyelids and face; and, as the obstruction to the circulation through the heart increases, the serous infiltration augments, and becomes more general.

—In simple hypertrophy, the *countenance* retains its complexion, or is more than usually florid; but when there is dilatation, and in proportion as the enlargement is complicated with obstructed circulation, and as the obstruction extends to the lungs, the lips, cheeks, and even the nose, present more and more of a purplish tint, and the *general surface* assumes a sallow and cachectic hue. — *Apoplectic, paralytic*, or *convulsive attacks*, and *pulmonary hæmorrhage*, have been already noticed as consequences of hypertrophy, particularly of its more complicated states. *Epistaxis* sometimes occurs, and prevents or defers the occurrence of either of these, or of some other serious symptomatic malady.

178. *c. The signs and symptoms of hypertrophy of the individual compartments* require some notice, those just mentioned having reference to this change of the ventricles generally.— The physical signs of hypertrophy of the auricles cannot be stated with any precision in our present knowledge; but, as this change is usually associated with hypertrophy of the ventricles, the distinction between them is not material. — *Hypertrophy of the left ventricle* may be recognised by the following signs: — The impulse of the heart is greatest under the cartilages of the fifth, sixth, seventh, and eighth left ribs; and in this situation there is the most dulness on percussion, and prominence of the thorax. The pulse, if there is no obstruction at the aortic orifice, is strong, tense, full, vibrating, or hard; the face is flushed, and the patient experiences throbbing headachs, giddiness, and sometimes even epistaxis. — *Hypertrophy of the right ventricle* is attended by a palpitation, or an impulse, which is strongest under the lower part of the sternum, where, also, is the greatest dulness on percussion, especially if this lesion be not associated with hypertrophy of the left ventricle; and the pulse possesses neither the force nor tension observed in this latter alteration. There are commonly more or less dyspnœa, short breathing, cough, and subsequently expectoration and lividity of the face; but, as I have shown above (§ 172.), these symptoms are still greater, and more frequently attended by hæmoptysis, when the lungs are congested in consequence of interrupted circulation through the left side of the heart, with which, however, this form of hypertrophy is occasionally associated. Turgescence, pulsation, or undulation of the jugular veins, was noticed, as a symptom of this alteration, by Lancisi; was rejected by Corvisart; but admitted by Laennec, and Hope. Bertin and Bouillaud consider that it is present chiefly in hypertrophy with dilatation, extending to the auricle, and when the right auriculo-ventricular orifice is imperfectly shut during the systole.

179. *F. Terminations and Prognosis.* — *a.* As long as hypertrophy continues simple, and moderate in degree, the patient may experience but little inconvenience from it beyond slight dyspnœa and palpitations, particularly on exertion. But if intemperate living be indulged in, or great corporeal exertion be resorted to, the disease will increase rapidly, and will lead to further change either of the heart or of the more immediately related organs, especially of the brain and lungs. The *progress* of the malady will consequently vary with the peculiarities and complications of the case, and with the habits, occupations, and treatment of the patient. — The *terminations* of hypertrophy depend also very much upon the same circumstances. In its simple states, apoplexy and active hæmorrhages are its occasional consequences (§ 169.); but, if these result not from it, the patient may live many years. When hypertrophy is attended by much dilatation, the symptoms are more severe, and its course more rapid. It does not so frequently cause apoplexy as the foregoing state; but it is generally accompanied with greater disorder of the respiratory functions. Dr. Hope remarks, that, when this form of the disease demands, owing to the palpitations and dyspnœa, periodical bleedings at short intervals, it hurries with an uninterrupted course to its fatal termination. In the majority of such cases, however, bleedings are not the appropriate means of alleviation.

180. Both the progress and termination of the malady, and consequently the prognosis, more especially depend upon the pathological causes and complications of it. When these consist of diseased valves or contracted orifices, the hypertrophy and dilatation usually proceed to a greater extent, and the balance of the circulation is more disturbed than in the simple form of the complaint. In such cases, congestions and even effusions of blood, or of serum, generally supervene, either in the substance of important viscera, or on venous or serous surfaces, and occasion various consecutive maladies, according to the particular lesion of the heart, and to the consequent seat of congestion, effusion, or infiltration of parenchymatous structures. Hence result pulmonary hæmorrhage, &c., œdema, or effusion into the bronchi, or into the pleural cavities, &c., followed by asphyxy. Abolition of the functions of the lungs causes stupor, or accelerates the alterations which often take place in the brain, especially congestion and sanguineous or serous effusions. Or these latter are the first to occur, especially when the primary lesion is in the right side of the heart (§ 169.).

181. *b.* The *prognosis*, it is evident from the foregoing, is generally *unfavourable*, especially in the more complicated cases, in proportion to the extent of lesion of the orifices and valves, and where hypertrophy is accompanied with adhesion of the pericardium. — Debility, age, a cachectic habit of body, and disease of the lungs, also increase the danger, or rather render it more imminent. — In the simple states and early stages of the malady, when the constitution is not impaired, and when the patient can be subjected to appropriate treatment, and is so circumstanced as to pursue it, the prognosis is much more *favourable*; and, although the alteration already existing may not be diminished, its progress may be arrested.

182. G. Treatment. — The circumstances which influence the terminations of hypertrophy, and the prognosis of it, should also control the treatment. The simple form of the malady, particularly in young and otherwise sound persons, requires very different means from the complicated, especially when occurring in broken-down constitutions: in the former, *vascular depletions* may be employed, and repeated from time to time; in the latter, they require great caution

and discrimination, or they may be injurious. — Laennec and Bouillaud advise bloodletting and other reducing and tranquillising means, in the manner recommended by Albertini and Valsalva, and to a decided extent. But I agree with Dr. Hope, in considering these measures hazardous, and often injurious, when pushed as far as these writers direct. — M. Laennec, especially, insists upon copious depletion at the commencement of the complaint, — upon a repetition of it every two, four, or eight days, until the palpitations cease, and the heart gives only a moderate impulse, — upon spare diet, with very little or no animal food, — and upon physical and mental repose. If the treatment is not commenced until hypertrophy has occasioned dyspnœa, dropsical effusions, œdema of the lungs, &c., he still advises bleeding and abstinence; and, in all cases, a perseverance in this plan, especially in abstinence, for many months; and he has no confidence in a cure until the expiration of a year (if the patient live as long) of complete absence of all the symptoms and physical signs of hypertrophy. — As to *bloodletting*, the opinion of M. Bouillaud is not materially different from that of Laennec. He prescribes, for an adult of medium strength, and for a medium degree of the complaint, three or four bleedings at the arm, each consisting of twelve or sixteen ounces, followed by one or two cuppings on the præcordia of eight or twelve ounces each, in the course of the treatment. He considers *digitalis* as the next most important remedy — as the true opiate of the heart; and employs it both internally and endermically. He applies a blister on the præcordia; and he sprinkles the blistered surface with from six to fifteen grains of powdered digitalis, directing, at the same time, and long afterwards, mental and bodily repose, and a very restricted diet.

183. *a.* Respecting *bloodletting* in this malady, my experience and opinions are in accordance with those of Dr. Hope; and I consider, with him, sparing abstractions of blood, at intervals of two or three weeks or more, to be the most beneficial. More copious depletions have given temporary relief; but the symptoms have soon returned with increased violence, and carried off the patient, especially in cases where there were also dilatation and lesions of the valves or orifices of the heart. As I have shown in the article Blood (§ 58.), large depletions increase the frequency of the heart's action; and this effect is more readily produced by them when this organ is in a state of enlargement. I perfectly agree with the above writer in considering, that the indications of treatment should be to diminish the quantity, without deteriorating the quality, of the blood, and without producing reaction, or permanently enfeebling the action of the heart and the energies of the constitution, — that from four to eight ounces of blood, taken every two, three, four, or six weeks, according to the circumstances of the case, will be sufficient to fulfil this indication, to keep down inordinate action, and to relieve the dyspnœa, — that the diet should be spare, and consist of white animal food, and liquids in small quantity; and that every thing heating or stimulating, or calculated to accelerate the circulation, ought to be avoided.

184. *b.* Much benefit will result from a judicious selection of *internal medicines.* — Of these, *digitalis, colchicum,* the *sub-borate of soda, mercurial alteratives, hydriodate of potass, refrigerants* and *diuretics,* are most deserving of notice. The secretions and excretions should be freely promoted, by a mercurial alterative taken at bedtime, and a mild purgative in the morning. Equal parts of infusion of digitalis and *camphor mixture* may be also given twice or thrice a day with five or six grains of the sub-borate of soda; or small doses of *colchicum*, with an alkaline subcarbonate, may be prescribed, in an infusion of *tilea Europea*, or decoction of marsh-mallows. — Diuretics are also of service, especially the supertartrate of potash with the sub-borate of soda, in the compound decoction of broom-tops, or in a weak infusion of senega, or in camphor julap, or in the decoction of taraxacum, — the nitrate of potash or soda, with spirits of nitric æther, — and the acetate of potash, with small doses of squill, or the infusion or spirit of juniper. When dropsical effusions take place, these, varied according to the peculiarities of the case, and aided by hydrogogue purgatives, are required; and one or other of the liniments prescribed in the *Appendix* (F. 297. 311.), with the addition of a little of the hydriodate of potash, may be rubbed or applied over the thorax daily. When the breathing becomes much affected, camphor, with small doses of ipecacuanha, and with hyoscyamus, or belladonna, &c., may be tried; and when debility or irritability is urgent, camphor, conjoined with hydrocyanic acid, or with digitalis and the extract of hop, or with gentle tonics and other narcotics, as the acetate of morphia, will be very serviceable. Digitalis was much praised by Ferriar in palpitations from organic lesions; and, when hypertrophy is attended with excessive action and distressing irritability, the following will be found useful: —

No. 256. ℞ Infus. Digitalis ℥ vijss.; Potassæ Nitratis ʒ ij.; Acidi Hydrocyanici ♏ xiv.; Syrup. Aurantii ʒ ij.; Misce. Capiat æger Coch. i. amplum secundâ quâque horâ.

185. *c.* When *diseases of the valves and orifices* of the heart have been concerned in the production of hypertrophy, the treatment is not materially, if indeed at all, different from what is here advised. The fixed alkalies, especially the liquor potassæ, may be given in suitable combinations, as with digitalis, camphor, and various diuretics. The internal exhibition of the hydriodate of potash has been tried by me in several cases; but the results have not always led me to persist in the use of it in cardiac hypertrophy from this cause. It may, however, be given in small doses, with liquor potassæ: it will then not be injurious.

186. *d. External derivatives*, especially setons or issues, inserted near the margins of the false ribs, or below them, have been prescribed by me in several cases, and in some with marked advantage. In every instance, the treatment should be assiduously persisted in; and a most abstemious diet and regimen rigidly observed. Repose of mind and body, and residence in a dry and pure air, are also most beneficial. — As the features of the disease vary, so should the treatment be modified, care being taken not to reduce the vital energies too low. As soon as exhaustion appears, it ought to be met by restorative means. Where

a free discharge is procured by setons or issues — which are especially indicated when the hypertrophy has been consecutive of rheumatic disease of the heart, — a gently tonic treatment will be often requisite; and if any preparation of colchicum be exhibited, it should be given with camphor or ammonia, or even with stomachic or gentle tonics.

ii. Of Dilatation of the Chambers and Orifices of the Heart.

— Syn. *Cordis Aneurisma*, Ballonius, Baglivi; *Passive Aneurism of the Heart*, Corvisart; *Cardieurysma*, *Cardiectasis*, Auct.; *Expansion of the Heart's Cavities*.

187. Charact. — *Slight palpitations, with dyspnœa and cough; the impulse of the heart being weak and diffused; the sounds being louder, clearer, shorter, and heard over a larger extent of the chest, than natural; and the pulse being weak, small, or irregular.*

188. *A.* Description. — *Dilatation* (*a*) may affect equally *the whole parietes* of one or more of the cavities; or (*b*) it may be so confined to *a portion of the parietes* of a chamber as to form an aneurismal pouch. — *a*. The *first* of these varieties usually presents itself in *three forms*: — 1st. *With thickening of the walls* of the compartments; — 2d. *With a natural state of the walls*; — and, 3d. *With attenuation of the walls.* — The *first* of these has been considered in connection with *hypertrophy*; and most of the remarks made with respect to it, also apply to the *second* of these forms. It is chiefly, therefore, to the *third*, or to *dilatation with attenuation* of the parietes of the chambers, that attention is now directed. — The muscular substance of the heart is often healthy, although dilated; but it more frequently is soft, flaccid, or even remarkably softened — especially when the attenuation, as well as dilatation, is great. Sometimes its structure is readily broken down by the pressure of the finger, and is of a deeper or darker red, or of a paler or more fawn-colour than natural. The more remarkable states of softening observed in connection with dilatation have been consecutive of inflammation of one or other of the surfaces, probably extending, in some degree, to the substance of the heart; and occurring in debilitated, previously diseased, cachectic constitutions.

189. This lesion of the heart is much rarer than dilatation with thickening, or with a natural state, of the parietes of the cavities; and the instances recorded of it are not numerous. Lancisi, Morgagni, Corvisart, Bertin, Kreysig, J. Frank, Laennec, Louis, and Hope have described but few cases of it. Burns and Laennec believed that rupture might proceed from dilatation; and Dr. Hope and Dr. Williams have met with this occurrence, which is most likely to take place in aged persons. Dilatation with attenuation seldom affects one ventricle without the other; but it is more common, or greater, in the right than in the left ventricle. It more rarely is seated in all the chambers of the organ. The attenuation exists in various degrees. It may be so extreme, that the walls of the ventricles hardly are equal to two lines at the thickest parts (Hope and Chomel). The fleshy columns are usually stretched and spread out. The interventricular septum is proportionately less attenuated than the other parts. The dilatation is more in the transverse than in the longitudinal direction of the ventricles; the heart thereby assuming a spherical form, and the apex being nearly effaced. When both the ventricle and auricle of the same side are much dilated, the intermediate *orifice* is generally also widened, and the valve *insufficient* to close it. As in cases of hypertrophy, the position of the organ is somewhat altered when the dilatation is great, it being more or less transverse, and towards the left. A very slight attention is sufficient to distinguish the distension that takes place, during the last moments of life, from morbid dilatation. The former is slight, presents the appearance of tension, and the muscular substance is healthy; the organ often resuming its natural size when emptied. The latter consists not only of distension, but also of flaccidity, thinning, and softening of the parietes.

190. *b. Partial dilatation of one of the heart's cavities* is but rarely met with. M. Bertin states, that he has seen one portion of a cavity dilated, and another in its natural state, or even thickened, especially in the right ventricle, near the pulmonary artery. This is evidently a slighter grade of that lesion which has attracted, more recently, considerable attention, under the appellation of "*false consecutive aneurism*" (Breschet), "*sacculated aneurism*," and "*true aneurism of the heart*" (Ollivier). This alteration has been observed by Galeati, Buttner, Corvisart, Baillie, Zannini, Berard, Rostan, Cruveilhier, Breschet, J. Johnson, Elliotson, Adams, Dance, Reynaud, &c. It was found in the heart of Talma, the celebrated French tragedian. It is exactly similar to the aneurism of large arteries, and has been met with only in the arterial side of the heart; and, excepting in a single case recorded by Dr. Elliotson, where it existed in the left auricle, always in the left ventricle. In many of the cases it was found at the apex; in some at the base, or at the middle of the ventricle; and in others at the front, or side. In this last situation it was detected in Talma. In the instances which occurred to Reynaud and Elliotson, two aneurisms were found in the same ventricle. This form of aneurismal tumour varies in *size* from that of a filbert to that of the heart itself. The larger tumours usually contain layers of dense coagula, similar to those which fill the cavities of arterial aneurisms. They communicate with the ventricle by a more or less narrow opening, which, with the whole of their interior surfaces, is generally lined with a membrane continuous with that of the ventricles. Like other aneurisms, they are most common in adult males.

191. *c. Dilatation of the orifices of the heart* is not less frequent than expansion of the cavities; and often coexists with it. The orifices may be dilated in various degrees, as already shown (§ 189.); but generally, when the change is very considerable, the valves become insufficient for their purposes, and the expansion, owing to the regurgitation into the auricles, extends to them. The auriculo-ventricular orifices are most frequently dilated; but in very rare instances, the arterial orifices have experienced this alteration in a slight degree.

192. *B. Causes.*—*a.* Most of the causes, remote and immediate, of hypertrophy, are also those

of dilatation of the *chambers* and *orifices* of the heart. As Dr. HOPE observes, dilatation is merely a mechanical effect of over-distension. Blood accumulated within the cavities, owing to an interruption to its exit from them, will dilate and attenuate their parietes, in proportion to the resistance opposed, and to the force exerted by the muscular structure in order to overcome it. When that force is weak, or insufficient to overcome the resistance, the parietes yield, and the cavities undergo dilatation, with a rapidity depending upon the weakness of the walls and the extent of interruption. It necessarily follows, that the cavity immediately behind the seat of obstruction will be the first to undergo dilatation, and will experience it to the greatest extent. The compartment, also, having the weakest parietes, is, *cæteris paribus*, the most frequently dilated. — Permanent dilatation is the result of prolonged or repeated causes, as contractions of an orifice, disease of the valves, and frequent returns of nervous palpitations. The depressing passions and emotions, as anxiety, fear, &c. (§ 19.), and whatever tends to weaken the power of the heart, may occasion this alteration. The walls of the cavities may also be unusually weak or thin, *congenitally* and *hereditarily*. LANCISI observed this lesion in four successive generations; and ALBERTINI saw a female die of dilatation, five of her brothers having been cut off by the same malady. It is most common in persons of a tall, thin, delicate, feeble, and nervous or lymphatic conformation, and lax fibres.—*Age* has also great influence on its production. It is not uncommon in young children; but it is most frequent in the aged. It rarely occurs in young adults, unless it has been induced by masturbation, or by fevers and diseases of the respiratory organs. In general, all obstructions to the circulation, whether situated in the orifices of the heart, or in the aortic or pulmonary system, will produce it, as well as hypertrophy; the supervention of the former being the result chiefly of debility of the organic nerves supplying the organ, and of impaired tone or deficient nutrition of the muscular structure — of antecedent disease, characterised by debility or cachexia, or by both.

193. *b.* When the *auricles* are protected by a natural state of their valves, and of the auriculo-ventricular orifices, the ventricles may be dilated without the former being materially affected; but when the auricular valves are diseased, so as to occasion interruption to the passage of the blood from the auricles, or when the auriculo-ventricular openings are dilated, so as to permit regurgitation from the ventricles, then the auricles become dilated, although rarely without some increase in the thickness of their parietes.

194. *c. The diseases of which dilatation is most frequently consecutive,* are, inflammations of the heart, and the lesions of the valves and orifices caused by them; rheumatism extending, or translated, to this organ; tubercular consumption; asthma and emphysema of the lungs; secondary syphilis, especially when treated by excessive quantities of mercury (ALBERTINI); adynamic, typhoid, and exanthematous fevers; scurvy, and carcinomatous and hæmato-encephaloid maladies. M. BERTIN contends that dilatation is generally consequent upon some obstacle to the course of the blood; and that the obstacle, at the same time that it gives rise to this lesion of the heart, produces other phenomena, as engorgement of the vessels, serous effusions, passive hæmorrhages; these phenomena, as well as the dilatation, being the result of the same proximate cause. Dr. HOPE justly observes that the change in the capacity of the cavities may result not only from obstacles to the circulation, but also from debility. There can be no doubt of deficient tone of the muscular parietes, and of the softening and asthenia of the organ, shown to follow adynamic fevers, and of protracted nervous palpitations, particularly when connected with chlorosis, anæmia, &c., being sufficient to cause dilatation of one or more of the chambers of the heart, independently of any appreciable obstacle to the circulation. Curvatures of the spine, and whatever diminishes the cavity of the chest, or presses inordinately upon the large vessels, may also occasion this alteration.

195. *d.* The same *causes* and *pathological conditions* which occasion the expansion of a whole compartment or of an orifice, may give rise to the dilatation of a portion of it only, in the form of an aneurismal cavity, especially whatever opposes the transmission of blood from the heart, as laborious occupations, the more violent mental motions as hatred, revenge, jealousy, anger, &c. — This — the only lesion of the heart which ought to be called aneurismal — may be produced independently of inflammatory action, owing to great muscular efforts, or obstacles to the circulation. Where the internal membrane is not destroyed, nor thickened, and where the muscular fibres are stretched, separated, or ruptured, antecedent inflammation may not have existed; but where there is thickening of the internal membrane, or ulceration, or adhesion of the external surface of the dilated part to the pericardium, this lesion may be considered to be a more or less remote consequence of chronic inflammation, affecting a portion of the parietes of the ventricle, the dilated part having lost its elasticity and contractile power. In connection with this, some obstacle to the circulation, or to the passage of blood from the left ventricle, has frequently also been present; the increased lateral pressure arising from impeded circulation dilating or extruding the most softened, weakened, or yielding portion of the ventricle. In the unique case of aneurism of the *left auricle* recorded by Dr. ELLIOTSON, there were extreme cohesion and ossification of the mitral valve, and consequent reduction of the auriculo-ventricular opening, — changes always consequent upon inflammatory action, as above insisted upon (§ 68.). The sinus of the auricle formed a large aneurism, containing dense and thick layers of fibrine; the interior of the tumour being lined with the smooth membrane of the cavities, as in aneurism of the ventricle.

196. C. *The Signs and Symptomatic Effects of Dilatation* have been partly noticed under the head of hypertrophy with dilatation (§ 175.); but those which more especially indicate dilatation with attenuation, remain to be detailed. — *a.* When the affection is considerable, and extends to both ventricles in uniform expansion of the parietes, the heart acquires a rounded shape, and the degree of contraction is lessened; and, as the apex is consequently less forcibly impelled against

the ribs, the impulse is slight, brisk, and low in the præcordia. The first sound of the heart is shorter, louder, and clearer than usual, and is heard over a larger extent than would be expected from the weakness of the impulse. When the dilatation is considerable, the first sound resembles in shortness and flapping character the second, and is to be distinguished from it only by its synchronism with the pulse of the carotids (Laennec, Hope, Williams). When the dilatation is dependent upon disease of the valves and narrowing of the origins of the arterial trunks, the sounds will assume a morbid character accordingly (§ 76.). The pulse in dilatation of the ventricles is necessarily feeble and often small, and various symptomatic lesions are observed, which, however, are referrible rather to the alteration that has produced the dilatation, than to the dilatation itself. In expansion of the left ventricle, the physical signs are most apparent to the left of the sternum, between the fifth and eighth ribs; and the symptomatic phenomena consist chiefly of dyspnœa, oppression in the præcordia, and dropsical effusions in the chest, &c. In expansion of the right ventricle, the physical signs are most evident under the sternum, and are accompanied with a pulsating swelling of the jugulars, especially if the dilatation extend to the auriculo-ventricular opening; the sympathetic changes being principally serous effusions within the cranium, or in the cellular tissue, ascites, œdema of the extremities, short breathing, and various signs of general cachexia.

197. *b.* The *symptoms of partial dilatation* (§ 190.) of the cavities are extremely obscure. Those stated by Dr. Baillie are common to all cardiac diseases. Auscultation renders us little or no assistance in ascertaining its existence. It rarely attains a large size — never so large as to produce an external tumour. The cases recorded by M. Reynaud and Dr. J. Johnson terminated in rupture of the aneurism without any previous suspicion of its existence. Dr. Elliotson's and M. Cruveilhier's cases presented symptoms which merely led to a belief in the existence of organic disease of the heart. In one of the two cases, mentioned in the catalogue of the preparations belonging to the medical department of the army, the patient had complained of cough, dyspnœa, pain in the chest, and hæmoptysis; in the other, the symptoms were not ascertained. Talma died of stricture, amounting nearly to obliteration of the rectum. The aneurism of the left ventricle was small and filled with concentric layers of fibrine. It was remembered that long previously, after having enacted the part of Orestes, in the play of Andromache, Talma felt himself strangely agitated, anxious, and restless for some time; but these symptoms gradually subsided. It was supposed that the internal membrane, or some of the fibres of the muscular structure, had then given way, the consequent effusion of coagulable lymph producing a partial and temporary cure. Others of the cases upon record have been equally obscure: whilst some have been attended by palpitations, urgent dyspnœa, cough, and short breathing; anxiety, pain, and constriction at the præcordia; weak, irregular, or intermittent pulse; inability to lie otherwise than on the back; sudden starting up from sleep, œdema of the extremities, &c.

198. *c.* Dilatation of the *orifices* gives rise to no indications of its existence, unless it is so considerable as to permit a reflux of the current of blood; and even then the signs are equivocal. This reflux is one of the causes of the bellows-sound, and of the purring tremor. When it takes place through the right auriculo-ventricular orifice, it causes a venous pulsation, particularly in the jugulars.

199. *D. Progress, Termination, and Prognosis of Expansion of the Heart.*—The *progress* of dilatation entirely depends upon the nature of the pathological condition, or antecedent disease, of which it is a more or less immediate consequence. A slight degree of expansion, depending chiefly on original conformation, and accompanied with a delicate constitution and thin muscles, may subsist long, or remain stationary for years, without occasioning much disorder beyond dyspnœa, shortness of breath, and palpitations on exertion, or slight asthmatic disorder; but when dilatation is consequent upon a permanent or increasing obstacle to the circulation, or is associated with adhesions of the pericardium, the symptoms are more severe, more rapid in their progress, and attended with evidence of general cachexia. When dyspnœa becomes urgent, or œdema or dropsical effusions take place, or when pulsation of the jugulars is observed, the disease is generally rapid in its progress, especially if exasperated by exertion, mental disquiet, or attacks of fever, &c.; although judicious treatment, by repeatedly procuring the removal of effusions, will often prolong life a considerable time. Much, however, will depend upon the age, strength, constitution, and previous state of the patient. Upon the above considerations the prognosis must entirely depend.

200. *E.* Treatment *of Dilatations of the Cavities and Orifices, with Attenuation of their Parietes.* — The *first object* is to ascertain the exciting or pathological cause of the dilatation, and to remove it as much as possible. When the cause consists of disease of the valves or orifices impeding the circulation, it is difficult, if not impossible, to effect this object, yet it ought not to be left unattempted; but when the cause is of a less permanent kind, as peripneumony, spinal curvatures, pertussis, asthma, bronchitis, hydro-thorax, emphysema of the lungs, &c.; or when the dilatation has been produced by laborious occupations, constrained postures, strait lacing, playing on wind instruments, &c.; this intention ought never to be overlooked; for, if the expansion have not proceeded so far as to deprive the muscular structure of the organ of its resiliency, a more or less complete restoration of the dilated cavity may be effected. Even when it is impossible to restore the organ to its healthy state, an increase of the dilatation may be prevented, and the patient's life may be prolonged to the usual limits.

201. The greatest attention should be paid to *diet* and *regimen*, as well as to the selection of *medicinal agents;* and both classes of means ought to be directed to the support of vital power. With this view, vegetable and mineral tonics may be prescribed, with aromatics, antispasmodics, and anodynes, according to circumstances. Small doses of quinine may be given with camphor and hyoscyamus, or of the sulphate of iron or of the sulphate of zinc, with the extract of hop. Valerian, assafœtida, the compound galbanum pill, or the compound iron pill, may also be exhibited in

similar forms of combination; or either of the alkaline solutions in use may be given with chalybeates, or with tonic infusions or decoctions. Where there is any obstacle to the circulation, referrible either to a morbid state of the lungs, or to diseased valves, the fixed alkalies, or the subborate of soda, with tonics, will be found of much service. If there exist pulmonary congestion, with copious and difficult expectoration, the decoction of *senega root*, with an aromatic water, and small doses of camphor, will be productive of benefit. If attacks of dyspnœa or of asthma take place, and if the dilatation be complicated with emphysema or with œdema of the lungs, this combination will be of use; or camphor, ammonia, assafœtida, ammoniacum, the æthers, &c. may be exhibited in forms, which the peculiarities of the case will indicate. At the same time, the surface of the body should be kept warm, and derivatives applied to the extremities, fresh air being freely admitted into the patient's apartment.

202. The utmost attention ought always to be paid to the state of the digestive organs. The secretions and excretions should be promoted; those of the liver and bowels being freely evacuated by an occasional dose of the blue pill at night, and of a stomachic aperient the following morning. Flatulent distension of the stomach and bowels, and acidity, should be especially guarded against, and removed by the means suggested in the article Flatulency (§ 15. *et seq.*); for these states of disorder remarkably aggravate both functional and organic affections of the heart, as shown in the article just referred to (§ 8.). — The circulation ought to be kept tranquil by moral and physical quietude, and by a light, nutritious, but not heating, diet. In order to preserve a free state of the cutaneous function, and to prevent catarrhal affections, flannel should be worn next the skin, and the feet kept warm by woollen stockings. Febrile and inflammatory affections, and particularly inflammations of the lungs and bronchi, as Dr. Hope very properly advises, should be sedulously guarded against, by adopting these and other means, and promptly treated when they occur. — But even in these circumstances, I would add, bloodletting ought to be resorted to with extreme caution, and rarely or never by venæsection. In all cases of expansion of the cavities of the heart, the organ is unable to accommodate itself to large or sudden losses of blood, and hence a fatal collapse may be the result of the abstraction of this fluid. If the contingent pulmonary congestion should render vascular depletion an appropriate remedy, a small quantity only ought to be taken away, and always when the patient is in the recumbent posture, restoratives and external derivatives being also resorted to.

203. If the expansion has followed low or adynamic fevers, or has been caused by venereal excesses or masturbation, or by non-inflammatory softening or relaxation of the muscular structure of the organ, as in cachectic, chlorotic, or scorbutic constitutions, *tonics* are especially requisite; particularly the preparations of iron, the tincture of the muriate of iron, and chalybeate mineral springs; residence in a pure and dry air, and light nourishing food. The vegetable tonics with the alkaline subcarbonates, or preferably with the vegetable or mineral acids, especially the muriatic, the nitro-muriatic, and the acetic, will also be of service, according to the state of antecedent and concomitant constitutional disease.

204. When *disease of the valves and orifices* of the heart, or any other obstacle to the circulation, of which dilatation is a consequence, has proceeded so far as to have also occasioned dropsical effusions, treatment is seldom productive of more than temporary benefit. The means which promise the greatest advantage, especially when effusion has taken place, are so fully stated in the article Dropsy (§ 45—47.), that I need not particularise them at this place. — If permanent dyspnœa, emphysema of the lungs, increased exudation into the bronchial tubes, and difficult expectoration, be associated with this state of cardiac disease, *expectorants*, especially the decoction of senega, the balsams, camphor, ammoniacum, &c., with opium, will be of service.

205. In addition to strict attention to *diet* and *regimen*,—the former consisting chiefly of light animal food, in moderate quantity, and the more farinaceous vegetable substances; the latter of mental and bodily quietude,—the patient should reside in a dry, bracing, temperate, and equable climate, and in large well-ventilated apartments. He should observe early hours, and, as his health improves, take very gentle exercise in the open air. The cold or salt water bath, or the shower-bath, will also be of service, if directed with caution and discrimination. — In this, as well as in all other affections of the heart, bulky, flatulent, and acescent vegetables should be avoided; and that kind of food preferred which is found to be most easy of digestion. Recourse may be had to chalybeate or other strengthening mineral waters, as convalescence advances. Admitting it possible that *partial dilatation or aneurism of the cavities*, and that *dilatation of the orifices* of the heart, may be detected during life, — a circumstance not likely to occur in respect of the former lesion especially, — the treatment will not vary from that which has been now recommended.

iii. Atrophy of the Heart — *Cardiac Consumption.*

206. Charact. — *Diminished size or wasting of the heart, the actions of the organ being feeble, limited in extent, and attended by a weak and confined impulse, and by little or no dulness on percussion in the præcordia.*

207. *A.* The heart may be unusually small, *from original conformation*, or *from disease*. — *a.* Many of the instances of extreme smallness of this organ on record are referrible to the former cause. Those adduced by Morgagni (*Ep.* lxx. 5.), Lieutaud (vol. ii. obs. 453.), Burns (*Op. cit.* p. 110.), Kreysig (b. ii. p. 468.), Otto (*Compend. of Comp. Anat.* p. 264.), and others, are of this kind. The majority of those referred to by Lieutaud and Ploucquet (*Med. Digest.* art. *Cor — parvum*) are stated so loosely by their respective authors, as to be almost devoid of interest. Otto thinks that a disproportionate size of the heart to the whole body is sometimes hereditary; and that, when it is congenital, it is often connected with other vicious formations of the organ, or with general weakness and imperfect developement. If a really small heart be fleshy, firm, and red, and its compartments in due proportion to one another, it may be considered as a vice of conformation.

208. *b. True atrophy*, or diminution of the

heart from disease, is rarely observed in a remarkable degree. Slight grades of it are, however, not uncommon, especially in wasting diseases, as phthisis, mesenteric obstructions, and chorea, although the atrophy of this organ is not so considerable, nor so rapid, as in other muscles. OTTO attributes this to the want of cellular tissue between the muscular fasciculi.—PORTAL, TESTA, and KREYSIG suggest, that the seeming diminution, caused by the violent contraction of the organ, at the time of death, should not be confounded with atrophy of it. True atrophy is accompanied with attenuation, softness, or paleness, or hardening of the structure, or with a shrivelled or wrinkled appearance of the surface of the viscus. It may be so considerable as to reduce the organ to one half or one third its natural weight. M. CHOMEL found the heart not larger than a hen's egg in a man who died in the hospital *La Charité*. As respects its form — 1st. One or more of the compartments are attenuated without any change in their capacities, the heart being but slightly diminished in bulk; — 2d. With attenuation there is much more rarely diminution of the capacities of the chambers, the organ being very much lessened in size; — and, 3d. With diminution of the cavities, the parietes may be of the natural thickness, or even above it: this is the most frequent form of atrophy.

209. *B.* The *Causes* of atrophy of the heart are — 1st. *Local*; — 2d. *Moral*; — and, 3d. *Constitutional*. — *a*. Of the *first*, the most common are compression arising from the pressure of matters effused into the pericardium, or from tumours developed in the mediastinum, and constriction or other changes of the coronary arteries, especially ossific deposits in their coats, &c. I doubt, however, the influence of compression from these causes, as the heart is very rarely found atrophied where the greatest amount of effusion has existed in the pericardium. In the case referred to below, where there obviously is extreme atrophy from local causes, the previous effusion never seemed to have been very great.* — *b*. The *moral causes* consist of mental anxiety, and all the depressing passions, particularly when their action has been prolonged. — *c*. The *general causes* are whatever arrests the nutrition of muscular structures; and yet the heart seldom participates in the change of these parts, or only in a slight degree. In the diseases just mentioned (§ 208.), more or less atrophy is sometimes met with; but it seldom bears any relation to the wasting of the voluntary muscles. In a case of tubercular consumption, in which death occurred instantaneously, before ulceration had commenced, and before emaciation had become considerable, the heart was small and flabby, and the parietes of the ventricles somewhat attenuated. The most marked cases of atrophy which I have seen were in persons who had died after attacks of chorea and chlorosis, and after hypochondriasis and distress of mind.

210. *C.* The *Symptoms* are seldom such as to indicate, with tolerable certainty, the existence of atrophy of the heart, unless it be very considerable. In this case, the impulse is weak, limited, or small; the sounds are indistinct, or faint, in proportion as the cavities are diminished in capacity; and there is little or no dulness on percussion. The pulse is small, thready, and often frequent; and there is commonly marasmus, and loss of colour. Yet emaciation can hardly be reckoned as a sign of atrophy, as it not infrequently accompanies hypertrophy of this organ.

211. *D.* The *Treatment* of this lesion should be directed — 1st, to the removal of the causes, as far as it can be accomplished; and, 2dly, to the restoration of the healthy nutrition of the organ. The latter of these intentions will be best accomplished by attention to the digestive and assimilative functions, and by the use of chalybeate medicines and mineral waters, with suitable exercise in a dry and temperate air; and the other means recommended for *functional disorders* (§ 50—53.), for *softening* (§ 221.), and for *dilatation* (§ 200.) of the heart.

212. iv. CONTRACTIONS OF THE CAVITIES AND ORIFICES OF THE HEART. — *A.* Diminution of one or more of the *cavities* arises — 1st. From *concentric hypertrophy* of the parietes (§ 158.); — 2d. From *atrophy* of the heart (§ 208.); — 3d. From the pressure of tumours, or of effused fluids, on one or more of the compartments of the organ; — and, 4th. From concretions of lymph or of fibrine, recent or organised. — The *first*, *second*, and *third* of these morbid states have received attention at the places referred to; the *fourth* will be fully considered hereafter. From whatever of these causes the diminished capacity of the cavities arises, it is evident that very serious phenomena will result as soon as this lesion becomes so great as to materially derange the circulation, especially venous congestions, and serous effusions and infiltrations. When the cavity of the left ventricle is diminished, the pulse is small, as in narrowing of the aortic orifice.

213. *B. Contraction of the orifices* of the heart may proceed from the same changes as produce diminution of the cavities; but it most frequently is a more or less immediate result of internal carditis, and attendant upon induration of the valves. As such it has already been considered, when treating of the chronic states of endocarditis (§ 66, 67.).

214. *C.* The *Treatment* of diminished capacity

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* The following case is singular: — A girl, at the age of seven years, was attacked with rheumatism of the joints of the upper extremities, with extension of the disease to the pericardium, — the former affection subsiding partially as pericarditis was developed. The treatment, mentioned in the *note* to par. 153., was prescribed, and the disease nearly disappeared. But the pericarditis returned on two subsequent occasions at considerable and irregular intervals; and, in the second and third attacks, the cartilages of the left ribs were pushed outwards by the effusion into the pericardium. A mercurial treatment was prolonged; recovery seemed more complete, and the case was dismissed. About eight or nine months afterwards, this child was brought to me with the lower half of the sternum, and the cartilages of the left ribs, which were formerly protuberant, drawing backwards towards the spine, so as to form a deep and large depression in this situation, and scarcely to leave sufficient space for an atrophied heart to lie between the spine and the depression. The epigastrium was drawn inwards, and upwards, on each contraction of the ventricles. In this case, which was seen also by some of my colleagues at the Middlesex Hospital, the repeated attacks of pericarditis had given rise to adhesions of the pericardium to the heart, and probably also to the pleura; to this atrophy had succeeded; and the sternum had been drawn inwards with the wasted heart. This child was, even in this state, much recovered. She could take gentle exercise. The heart did not present any morbid sound, at this period; but there was well-marked epigastric pulsation, of a confused kind, probably owing to the pressure of the heart on the aorta. She was alive and able to be about when this was written.

of the *cavities* is rarely followed by any benefit. The changes producing it manifestly are beyond our resources. This remark is nearly applicable to contraction of the *orifices*. The means, however, which may be employed, should depend upon the cardiac lesions, and the symptomatic changes consequent upon this alteration of the orifices and valves. If *hypertrophy* have become associated with it, the treatment advised in the chapter on this lesion (§ 182.), according to the form it may assume, will be appropriate. If *expansion* of the cavities have taken place, the means prescribed under that head will be requisite (§ 200.).

215. v. OF ALTERATIONS OF THE COLOUR AND CONSISTENCE OF THE HEART. — *A*. The *colour* of the heart may vary, or be irregular, both on its surfaces and in its substance. One or more *white* specks, or patches, of different sizes, are often found. They are produced by a slight inflammation, causing thickening and opacity of the membrane, and are seated in either the internal or external surfaces. The structure and external surface of the organ are often *paler* than natural in cachectic, dropsical, and leucophlegmatic habits; and are sometimes of a *pale yellow* in these habits of body, and in hearts which are preternaturally fat. In inflammation, and in hypertrophy, this organ is *redder* than usual. In softening, suppuration, mortification, and other organic lesions, it is often spotted, of a *greyish*, *light*, or *dark brown*. Sometimes the internal surface, in one or all the cavities, is *reddened* throughout by the imbibition of the colouring matter of the blood; and a similar discolouration of the external surface has been observed to follow from the transudation of blood, and from hæmorrhage into the pericardium. OTTO found the heart tinged with green in a case of poisoning with stramonium seeds.

216. *B*. *Alterations of consistence* have already been partially noticed (§ 113—115.); but chiefly as consequences of inflammation. — *a*. *Softening* of the heart is not infrequently found in persons who have died of low fevers and malignant diseases, and it then occurs in the advanced stages of these maladies; but it is also met with under other circumstances. It presents two forms — one the result of inflammation (§ 113.), generally with asthenic characters; the other seemingly in no ways arising from inflammatory action, but rather from impaired organic nervous or vital power, and insufficient nutrition of the organ.—In the former, the softening is most commonly attended by a deeper tinge of colour, or discolouration; and the substance of the heart is not wasted, or is even more bulky than natural; signs of antecedent inflammation being usually present either in the internal or in the external surface, or even in the substance of the organ itself. In the latter form the heart is paler, as well as softer, than usual, — is easily broken down, — and frequently the cavities are somewhat dilated; but there is rarely any other distinct vice of structure. In a few extreme cases, the muscular fibres present a sort of fish-like structure, especially in young chlorotic and leucophlegmatic persons.

217. The non-inflammatory form of softening is met with chiefly under the circumstances just mentioned, and in fatal cases of scurvy, purpura, chorea, dropsy, and anæmia. In all these I have seen it, as well as in mesenteric decline, and tubercular consumption. It is occasionally associated with an inordinate deposition of fat around the organ; this latter being generally attended by a relaxed, pale, softened, or atrophied state of the muscular structure of the heart. In persons who have died suddenly, and without any distinct cause, the heart is sometimes soft, flabby, and even bloodless. Cases of this kind are recorded by Mr. CHAVALIER, and by my friend Mr. WORTHINGTON (*Lond. Med. Reposit.* vol. xvii. p. 361.). An instance also recently occurred in my own practice. In the softened state of the heart found in low fevers and in other contaminating diseases, there is also observed more or less dark discolouration of it. Violent exertion diminishes the vital cohesion of this organ, as well as of other muscles, deepens its colour, and causes it to be easily broken down. SENAC and OTTO found it very soft in hunted deer. This alteration is probably increased by the effect which an inordinate acceleration of the circulation produces upon the fibrine of the blood, as shown by HALLER and others. (See art. BLOOD, § 134.)

218. *b*. The *Symptoms of softening* entirely depend upon the proximate cause. If it arise from inflammation, then it is generally attended by the signs and symptoms of an associated *endocarditis* or *pericarditis*. If it be accompanied with *dilatation*, more or less of the phenomena attendant upon that lesion may be expected. In its simple or non-inflammatory states, there are generally great languor and debility; a soft, quick, weak, feeble, and small pulse; frequent faintings; a sallow, pale, faded, or tallowy complexion; passive œdema of the extremities, and sometimes of the countenance; the sounds of the organ being dull and obscure, and the impulse weak or nearly gone. As this lesion is often attended by effusion into the pericardium, the sounds and impulse will be further obscured by this circumstance; and the sphere of dulness on percussion extended accordingly. When it is not thus associated, the faint sounds and impulse of the heart will not be attended by greater dulness on percussion than natural. (See also the sections on *Inflammations* (§ 121.) and on *Dilatation* (§ 196.).

219. *c*. *Induration of the heart* is generally a remote consequence of inflammatory action (§ 119.), and is more rarely observed than the opposite lesion. It is often simulated by an unusual contraction at the moment of dissolution. In hypertrophy, also, the heart is firmer than natural, but not to amount to a morbid induration, so as to afford great resistance to the scalpel, or to cause a crepitation on dividing it. — Induration may occupy the whole of a ventricle, or only part of it; and it may accompany other lesions, or alterations of the organ as to size. It is evidently the consequence of altered nutrition, and is different from the firmness observed in hypertrophy, as well as from the cartilaginous and osseous hardening of portions of the organ sometimes consequent upon inflammatory action (§ 120.).

220. *d*. Of the *Signs* and *Symptoms* of this lesion, nothing positive is known. LAENNEC supposed that, in its slighter grades, the impulse of the heart was increased; and CORVISART thought that, beyond a certain point, it rendered the

contractions of the ventricles more difficult, and their movements more confined.

221. *e.* The *Treatment* of alterations of the consistence of the heart should be directed according to the evidence of these changes that may exist, and to the associated cardiac and symptomatic changes. In *softening*, we must depend chiefly upon the exhibition of tonics, especially quinine, cinchona, mineral acids, &c., or upon the tincture of the muriate, or the sulphate, or the other preparations of iron, pure air, and the means recommended for dilatation (§ 200.). If it were possible to ascertain the presence of *induration* of the heart, but little could be hoped from medical means. Those advised for hypertrophy (§ 182.) are, perhaps, the most appropriate.

222. vi. Of Serous and Sanguineous Infiltrations of the Heart. — *A. Infiltration of Serum into the Cellular Tissue of the Organ — Œdema of the Heart*, Bouillaud — is very rarely seen. This writer, however, describes it as follows: — The celluło-adipose tissue enveloping the viscus presents the form of a tremulous, gelatiniform mass; from which exudes, upon pressure, a liquid, transparent serum, which is sometimes colourless, and occasionally of a yellowish green tint. The cellular tissue which is thus infiltrated is of a dull white, or opaline hue, as if macerated by the contained fluid. — This alteration may accompany other dropsical maladies, or cachectic states of the system; but it is referred, by M. Bouillaud, chiefly to a varicose state of the coronary veins, consequent on the difficult passage of the blood from them into the right auricle. Obliteration of some of the cardiac veins will occasion this lesion; but it has hitherto not been described.

223. *B.* The *Exudation* or *Infiltration of Blood* into the cellular tissue of the heart — *Cardiac Hæmorrhage* — has been also met with, but very rarely, and chiefly in the form of *petechiæ*, or small *ecchymoses*. One or two instances of a more copious hæmorrhage into the substance of the organ, so as to form a distinct hæmorrhagic cavity — *Apoplexy of the Heart* — have been recorded. — *Petechiæ* and *ecchymoses*, principally on either of the surfaces of the organ, have been noticed by Stoll, Fairbairn, and Otto. I met with this alteration in a case of purpura hæmorrhagica, and in another of scurvy. In these diseases, and in the putro-adynamic states of fever, I believe that it is not very uncommon. Otto (*Comp. of Path. Anat.* § 177. p. 278.) states, that he met with effusions of blood, in various parts of the heart, in a case of petechial fever; also in a person killed by fire-damp, and in a child who died of hooping-cough. In a case of violent inflammation of the heart, he found small extravasations of blood under the outer membrane. Dr. Fairbairn (*Trans. of Med. and Chirurg. Soc. of Edin.* vol. ii. p. 157.) observed effusions of blood under the inner membrane of the heart in a case of purpura; and Cruveilhier (*Anat. Path.* livr. xxii. pl. 3.), saw the same lesion in the substance of the left ventricle. The exudation and effusion of blood into the pericardium has received attention in the article Hæmorrhage (§ 276.).

224. vii. Of Fatty Degenerations and Obesity of the Heart. — The *fatty degeneration of the structure* of the organ is not to be confounded with an *excessive deposition of fat* between the pericardiac covering and the substance of the heart, frequently met with in corpulent persons. — *a. Excess of fat in this viscus* is often accompanied with a flabby, softened, and attenuated state of the parietes. In these cases, the adipose substance often penetrates to some depth between the muscular fibres. — The symptoms attending this state of the organ cannot be referred so much to the accumulation of fat — to *the obesity of the organ* — as to the change in the muscular parietes attending it; both alterations being results of weakened organic nervous energy, and of, consequently, impaired assimilation.

225. *b. The true greasy degeneration* is a transformation of the muscular substance of the organ into a fatty matter similar to that first described by Haller and Vicq d'Azyr as occurring in the muscles. This lesion is generally confined to a portion of the parietes. Laennec and Andral met with it only at the apex. Dr. Hope found the greater part of both ventricles thus degenerated, the colour being that of withered leaves. More rarely, the substance of the heart has the appearance of lard, as remarked by Corvisart, Burns, Duncan, Cheyne, Luchett, and Chomel; the less altered portions in these cases are not only soft and flabby, but they also have an oily aspect.

226. *c.* Both these forms of fatty degeneration sometimes nearly approximate. M. Andral remarks that, most frequently, the muscular fibres are not really converted into fat, but are only atrophied by the excessive deposition of fat between them; yet, in some cases, they seem to have undergone this change, as they grease both paper and the scalpel, owing to an oily matter infiltrating them. That the atrophy of the muscular substance is not a mere consequence of the accumulation of fat, as Andral and others suppose, and that both changes are joint consequences of impaired vital power and imperfect assimilation, are satisfactorily shown by the circumstances under which they occur — by their being met with only where these primary pathological conditions exist, especially in aged persons, and by their having been found in connection with an excessive quantity of oil in the blood; the increase of this fluid in the circulation being a manifest result of impaired assimilation. Mr. Smith (*Dub. Journ. of Med. Science*, vol. ix. p. 412.) has detailed two cases in which this connection was observed; and one recently fell under my own observation. In Mr. Smith's cases, globules of limpid oil floated on the surface of the blood; in my case, the serum was remarkably milky, from the quantity of fat it contained. — From the history, and the alterations found on dissection, of two cases detailed by Dr. Duncan (*Edin. Med. and Surg. Journ.* vol. xii. p. 65.) and by Dr. Simeons (*Heidl. Kinisch. Ann.* t. iii.), it appears that inflammation of the heart may terminate in the true fatty degeneration of the muscular substance of the organ.[*]

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[*] It may be interesting to subjoin the particulars of a few of the cases of this lesion which have been put upon record.

1. A young married woman was seized, ten days before coming under Dr. Duncan's care, with rigors, followed by great anguish and pain under the sternum, with jactitation, want of sleep, rheumatism of the joints, pleuritic pains in the chest, cough, expectoration, dyspnœa, in-

227. *d.* Of the *Signs of Obesity and Fatty Degeneration of the Heart* little can be stated with confidence. Many writers suppose that the accumulation of fat, together with the softening of the muscular substance, embarrasses the organ, and ultimately arrests its action. Boerhaave thus accounted for the sudden death of a person whose heart was found loaded with fat. Portal (*Anat. Med.* t. iii. p. 75.) believed that obesity of the heart produces palpitations, dyspnœa, asthmatic affections, and even sudden dissolution; and Bonet, Senac, and Fothergill entertained similar opinions. — It has been also supposed that the softening and attenuation of the muscular substance attending the excessive deposition of fat in this organ, dispose to *perforation* or *rupture* of it. Morgagni and Bouillaud have recorded cases which favour this view. In one of the two interesting instances adduced by Mr. Smith, the sudden death was owing to rupture of the left ventricle. Kreysig remarks that, more commonly, obesity of the heart gives rise to no symptoms by which its existence can be inferred during life. M. Chomel, however, thinks that it often occasions dyspnœa and palpitations, and very probably faintings, or sinking; an irregular, weak, soft, small, and slow pulse; and anasarca, or œdema of the extremities, may also be produced by it.

228. *e.* An excessive deposition of fat under the pericardium, according to M. Bizot, is much more frequent in *females* than in *males*. He found, in 35 of the latter, the heart very much loaded with fat in 4; but, in 42 of the former, it was equally charged in 23 cases. That the accumulation of fat around the heart is not necessarily connected with, nor dependent upon, general obesity, is shown by the circumstance of 29 of the female cases having been thin or emaciated, and yet of these there were 14 instances of obesity of the heart. Of 13 females of a full habit, 9 presented an accumulation of fat around this organ. In 25 *phthisical females*, M. Bizot found a maximum deposition of fat in this situation in 11 cases, a medium quantity in 11, and complete absence of it in 3. In 11 phthisical men, this deposit was wanting in 6, and very scanty in 5. (*Mém. de la Soc. Méd. d'Observat.* t. i. p. 351.) I have observed an unusual accumulation of fat around the heart most frequently in habitual drunkards.

229. *f.* A *morbid deposition of fat* has likewise been observed on *the external surface*, and between *the layers of the pericardium*; sometimes to the extent of producing an injurious pressure upon the heart and great vessels; and even sudden death. Instances of this change have been noticed by Bonet, Senac, Godart, Morgagni, Meckel, Testa, Parry, Black, Kreysig, and Horn. That this deposition is entirely independent of general obesity, is confirmed by the remark of Otto, who states, that he has met with it although there was meagreness of other parts of the body. Fatty deposits on the pericardium have been incorrectly considered as causes of angina pectoris, by Fothergill, Wall, and Schramm; they are only contingently associated with it, or with neuralgia of the heart, in rare instances.

230. *g.* The *Treatment* of this lesion, in cases where the above indications, conjoined with a leucophlegmatic and corpulent state of the frame, render its existence probable, consists in whatever will improve the digestive and assimilative functions and the organic nervous energy. Tonics, chalybeate preparations; iodine, or iodine with iron; stomachic aperients; regular exercise in a dry open air; and abstinence from fat, oily, or rich articles of diet, and from stimulating beverages, especially spirituous and fermented liquors; constitute the chief means of cure — if, indeed, a cure be practicable.

231. viii. Of Adventitious Formations in the Heart and Pericardium. — *A. Of Earthy and Ossific Depositions*, little remains to be added to what has been already advanced, when considering them as occasional terminations of chronic inflammation (§ 119, 120.). But calcareous phosphates are sometimes deposited in circumstances which are by no means conclusive of the presence of inflammatory action, particularly in

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ability to lie down, followed by œdema of the extremities, the pulse having become weak, soft, and small. The treatment was antiphlogistic for some time after her admission into the hospital (on the eleventh day of the disease), and subsequently palliative. — She died six weeks after the attack. — On *dissection*, the pericardium was found universally inflamed, and firmly adherent to the heart. The lungs were agglutinated to the pericardium, and to the costal pleura. The heart was enlarged, and thickly covered with coagulated lymph, by which the pericardium adhered to it. Under this lymph, about two thirds of the structure of the heart was changed into condensed fat, which melted, stained paper, and swam in water: the remaining third had almost lost its muscular appearance. — The columnæ carneæ, in both the ventricles, were larger than natural. Ossific deposits were found in the aortic and mitral valves.

2. A gentleman, aged sixty, who had experienced attacks of gout, and had lived fully, was struck with apoplexy; for which he was treated, by Dr. Cheyne, in the usual manner. His pulse, however, continued extremely unequal and irregular; dropsy supervened; and he died, some weeks afterwards, of a recurrence of the apoplectic seizure with hemiplegia. — On *dissection*, the heart was found greatly hypertrophied. The lower part of the right ventricle was converted into a soft fatty substance; the upper part was remarkably thin, and gradually degenerated into this substance. The whole substance of the left ventricle, with the exception of the internal reticulated structure and columnæ carneæ, was converted into fat, the cavity being greatly enlarged. The valves were sound. The aorta was studded with steatomatous and earthy concretions. The principal peculiarity in the symptoms was the state of the respiration, which was irregular, and often suspended for a quarter of a minute. (*Dublin Hosp. Reports*, vol. ii. p. 216.)

3. Mr. Adams (*Ibid.* vol. iv. p. 396.) has detailed the case of a man, aged sixty-eight, of a full habit of body, who was subject to cough, and frequent attacks of an apoplectic nature. His breathing was irregular, and his pulse about thirty in a minute. He died from an apoplectic attack. — On *dissection*, the right auricle was much dilated. The right ventricle seemed composed of fat, of a deep yellow colour through most of its substance. The reticulated lining of the ventricle, which, here and there, allowed the fat to appear between its fibres, alone presented any appearance of muscular structure. The left ventricle was very thin, and its whole surface was covered with a layer of fat. Beneath this the muscular structure was not a line in thickness, and was soft, easily torn, and like liver. The septum of the ventricles presented the same appearance. In both ventricles, even in the lining fibres, yellow spots were seen, where fat had occupied the place of muscular structure. The whole organ was very light. The valves of the aorta were partially ossified.

4. A girl, during arthritic rheumatism, complained of various symptoms, many of which were referrible to the heart. Internal heat, with coldness of the surface, suppressed menstruation, cold perspirations, very feeble action of the heart, were complained of. Death took place after ten months. — On *dissection*, the lungs were found adherent to the pericardium and costal pleura. Yellowish white filamentous adhesions existed between the heart and pericardium. Two thirds of the muscular substance of the organ was converted into a greyish yellow mass of fat. (Dr. Simeon's *Op. cit.* Heidl. 1827.) — See, also, Dr. Elliotson *On Diseases of the Heart* (p. 32.), and the two cases recorded by Mr. Smith, in which free oil was seen in the blood; and in one of which, also, softening and rupture of the left ventricle were observed.

aged persons, and when other consequences of this action are not observed.—*a.* In many cases, a whitish patch appears, either in the fine cellular tissue uniting the enveloping membrane to the heart, or between the reflections of the internal membrane composing the valves, increases in thickness, and assumes more and more the characters of cartilage, especially in the latter situation. The morbid secretion giving rise to this patch ultimately becomes the seat of osseous or earthy deposits. M. ANDRAL divides the ossiform formations found in the heart into *three species*, as they are seated in the cellular, fibrous, or muscular tissue.—(*a*) That in the *cellular tissue* is the most common, the portion of it uniting the reflections of the internal membrane to the fibrous structure of the orifices and valves being most frequently thus altered. The calcareous phosphates are deposited in the cellular tissue, in minute grains, or in considerable masses, separating and compressing the surrounding textures. They are more rarely met with in the tissue connecting the muscular fibres; and they there form either isolated masses, or are connected with the deposits formed around the orifices.—(*b*) The *fibrous tissue* frequently also becomes the seat of the osseous deposit, and chiefly in three points:—1st. In the tendinous zone encircling the left auriculo-ventricular orifice;—2d. In the fibrous structure of the valves;—and, 3d. In the tendons of the mitral valve.—(*c*) The third species is the most rare. Indeed, it is doubtful whether the *muscular fibre* ever becomes the seat of this alteration. It seems more probable that the deposits, in the connecting cellular tissue, by their bulk, compress or partially destroy the muscular structure, than that this structure is converted into bone. The rare instances on record, especially those adduced by BURNS, RENAULDIN, and others above referred to (§ 119.), are most probably merely proofs of the partial destruction of the muscular tissue in the seats of the excessive osseous or calcareous formations.

232. *b.* The *pericardium* very rarely presents patches of the cartilaginous and osseous transformations. Instances, however, of the former have been recorded by BOERHAAVE, RIOLAN, HAUTESIERK, MORGAGNI, SAVIARD, OTTO, and TESTA; and of the latter have been observed by AURIVILLIUS, SAVIARD, WALTER, HALLER, PASTA, SENAC, PROST, RAYER, LAENNEC, and ABERCROMBIE, in the fibrous or in the serous layer.—Fibro-cartilaginous and osseous concretions are still more rarely found loose in the cavity of the pericardium. They have been detected only by LANZONI and OTTO; and have probably had their origin in peduncular tumours, which had subsequently been broken off.

233. *c. Signs.*— LAENNEC supposed that cartilaginous or osseous formations in the substance of the heart may be recognised, when very considerable, by an augmentation and modification of the sound. That a morbid sound will be heard when the orifices and valves are implicated, cannot be disputed; but the phenomena consequent upon these changes, when confined to the body of the organ, have not been observed with any precision. In a case noticed by M. ANDRAL, the suppositions of LAENNEC were not confirmed. It is unnecessary to add that these lesions are altogether beyond the reach of *treatment*.

234. *B. Tubercular Formations* have been very rarely found in the muscular structure of the heart. M. LAENNEC met with only three or four cases; but OTTO and BOUILLAUD never saw one. M. ANDRAL remarks, that the heart is one of the organs in which tuberculous deposits are most rarely observed. Instances, however, are recorded by HILDANUS, BONET, MORGAGNI, PORTAL, AUTENRIETH, SPENS, LAWRENCE, BAYLE, MACMICHAEL, and ELLIOTSON, at the places referred to below. In a man, aged 34, who complained of pain in the chest, cough, inability to remain in the recumbent posture, and subsequently of irregularity of pulse and palpitations, hypertrophy of the left ventricle, and tubercular formations in the muscular structure, were found after death. (*Cat. of Prepar. in Museum Fort Pitt, &c.* p. 38.) In an aged man, who died of pulmonary consumption (*Dub. Med. Journ.* 1833), a tubercular mass was found in the parietes of the left auricle obstructing the trunks of the pulmonary veins. M. SAUZIER detected, in a man who died of tubercular disease of the lungs, pancreas, &c., tubercles in a crude state in the walls of the auricle, the pericardium being adherent in the situation where they existed. Most of the cases of this lesion on record have occurred in persons who were labouring under extensive tubercular disease of the lungs and other organs; many of them have not been observed with any degree of precision; and the anatomical descriptions have generally been very loosely given.—Tuberculous productions have been found also in the internal surface of the *pericardium*, by MUSGRAVE, HALLER, VOIGHTEL, BAILLIE, OTTO, and others.

235. *C. Watery Cysts* and *Hydatids* have been detected both in the substance, and on either of the surfaces, of the heart.—*a.* Simple *cysts* have not infrequently been confounded with hydatids; the former having been described as instances of the latter formation, especially some of those mentioned by BONET, RUTTY, MORGAGNI, HUERMANN, SALZMANN, CLOSSIUS, and others. PORTAL found several hydatids on the base of the heart; MECKEL and BERNHARDI, large hydatid sacs on the left ventricle; PRICE, a large single hydatid in the muscular substance, in a boy who died suddenly; ABERCROMBIE, a bag containing two ounces of albuminous fluid on the left auricle; and TROTTER, two hydatids within the right ventricle. It is, however, doubtful whether these were really cases of hydatids. From the imperfect account given of the most even of these, it may be inferred, that some of them, at least, were merely instances of serous cysts.—M. ANDRAL remarks, that these cysts vary from the size of a pea to that of a large hen's egg. They are most frequently found between the external surface of the heart and pericardium; but they are sometimes seen on the internal surface of one of the chambers. In other cases, they are not visible on either surface, and it is only on dividing the muscular structure that they are detected. M. DUPUYTREN saw a number of these cysts imbedded in the walls of the right auricle, and protruding a considerable way into its cavity. M. ANDRAL found a cyst, as large as a walnut, in the walls of the left ventricle, which were slightly hypertrophied. In another case, he detected one on the free surface of the lining membrane of the right ventricle, attached to it by a delicate pedicle

of the same texture as this membrane. Dr. ELLIOTSON mentions a case in which a number of globular cysts, containing a bloody fluid, were attached by pedicles to the fleshy columns.

236. *b.* Instead of simple cysts, true hydatids have been found in the heart, but in extremely rare instances in the human subject; they are more frequently met with, in this organ, in the lower animals. M. ANDRAL has often seen them in the hearts of measly pigs, and only once in the human heart. OTTO saw them protruding into the right auricle in one case; and in a man who died of diseased testes, he detected "a heap of hydatids on the Eustachian valve, hanging by several threads into the right ventricle." These, however, were probably only a cluster of simple cysts. Mr. SOUTH states, that, at St. Thomas's Hospital, there is a heart with a cyst on its apex, as large as a hen's egg, which was filled with hydatids. Watery cysts and hydatids have been found not only under that part of the pericardium reflected over the heart, but also either attached to the inner surface of the bag of the pericardium itself, or lodged between its layers.

237. *D. Tumours* of various kinds are noticed by the older writers as having been found in the substance of the heart. But, owing to their deficient anatomico-pathological knowledge, and to loose or defective descriptions, the exact nature of these is unknown. To these belong the cases recorded by RHODIUS, SCHENK, COLUMBUS, and BONET; and those collected by LIEUTAUD. — Tumours of a *steatomatous* nature have been observed by PENADA, FLEISCH, SPRENGEL, and OTTO; and others, of a *melicerous* and *gritty* kind, by MORGAGNI, WALTER, ARNDT, and CRUVEILHIER. OTTO states, that he has seen a flat gritty tumour in the substance of the right ventricle of an old woman; and five or six encysted tumours, the size of hazel-nuts, in the left ventricle of a young man. In an officer, who was the subject of chronic hepatitis, dropsy, &c., the slightest exertion producing severe palpitation, hurried and oppressed breathing, and a sharp irregular pulse, the heart was enlarged, and presented a large encysted tumour on the right auricle, the aorta being ossified at several points. (*Catal. of Prepar. in Mus. Fort Pitt, &c.* p. 36.)

238. *E. Sarcomatous Formations*, and *Medullary Sarcoma* or *Encephaloid Productions*, have also been found in both the heart and pericardium. OTTO remarks, that *sarcoma* occurs — 1st, as single little roundish knots, deposited between the layers of the valves; — 2dly, as white condylomatous growths on the inner surface, and especially on the valves; — and, 3dly, as spheroidal, smooth, tolerably large, and solid growths, or true sarcoms. The *first* is common: and instances of the *second* are recorded by LANCISI, BONET, MORGAGNI, SANDIFORT, TESTA, LAENNEC, DESRUELLES, &c. CORVISART, SCARPA, and some others, consider them of a syphilitic nature; whilst BERTIN and BOUILLAUD controvert this opinion. OTTO states that he has met with them large, grape-like, or in the form of a cock's comb or cauliflower, both in syphilitic and in other persons. BOUILLAUD views these formations as the consequences of modified states of chronic inflammatory action. The *third* variety is most rare. It has been observed in either surface, and in the substance, of the heart, by FORLANI, BLANCARD, SOEMMERRING, OTTO, RIGACCI, NASSE, and others. MECKEL found fifteen of these productions, from the size of a pin's head to that of a hazel-nut, partly within, and partly without, the heart. TESTA found them in the heart of a person long afflicted with syphilis. Mr. SOUTH states, that, at St. Thomas's Hospital, on the interior of the right auricle of the heart of a man, who had a sarcomatous growth in the nostrils, there were two similar productions, one as large as a bean, the other as a pea.

239. *F. Medullary Sarcoma*, or *Fungoid Disease*, in modified forms, may implicate the heart or pericardium, or both. As in the case of tuberculous deposits, it is observed principally in cases, where this disease had previously appeared in other parts of the body. BARTZKY found it on the anterior and upper part of the heart; SEGALAS D'ETCHPARE, in a boy; CRUVEILHIER, in an old man; OLLIVIER, and several authors quoted by OTTO, in persons advanced in life. In all these, there were similar tumours in other parts, and the muscular structure of the heart was chiefly affected. When this disease is seated in either the posterior or the anterior mediastinum, the pericardium may be penetrated by it, and the heart itself implicated. This was observed in the case of a woman whose arm had been amputated on account of this malady (GERSON and JULIUS, *Magaz. der Ausl. Liter. d. q. Heilk.* September, 1823, p. 199.). The pericardium was involved in it, in a case which lately fell under my observation. The disease was seated in the mediastinum, and extended not only to the pericardium, but also to the sternum and ribs; its nature being recognised during life. In a case published by M. VELPEAU, encephaloid tumours were found in the substance of the heart, in the lungs, between the pleura and ribs, in the bronchial glands, under the mucous membrane of the stomach, in the duodenum, in the pancreas, and right kidney, in the liver to the number of some hundreds, between the tunics of the gall-bladder, in different parts of the peritoneum, on the upper surface of the brain, in the thyroid gland, and under the skin, and in the muscles of the right thigh. The aorta also was completely obstructed by fungoid masses.

240. M. ANDRAL twice saw this disease in the right side of the heart. In the first case, the patient presented signs of hypertrophy of the left ventricle. In addition to this, almost the whole of the right ventricle and auricle were converted into a firm, dirty white substance, traversed by a number of reddish lines, and possessing all the characters of the encephaloid substance. The second case was that of a man of middle age, who had enjoyed good health till two years previously, when he became slightly asthmatic. He continued in this state for five or six months, when he was suddenly seized with the most excruciating pain, confined at first to the region of the heart, but soon extending over the left side of the thorax. His dyspnœa increased, and he had violent palpitations and vomiting. The pain abated after an hour, and the next day he was as usual. During the following year the dyspnœa increased, and the pain returned seven or eight times. He afterwards became much emaciated, had a peculiar sallow tinge, and evening exacerbations of fever. The attacks of violent pain were now frequent, but of short continuance. He had also occasional attacks of palpitation, but there was no stethoscopic

evidence of disease either in the heart or lungs. After some time he became œdematous, and died suddenly. The wall of the right ventricle was occupied by a large knotted tumour, extending from the apex to the base, projecting very much externally, and protruding internally into the ventricle. The encephaloid substance composing it was firm in some points, and soft and diffluent in others. (*Anat. Path.* t. ii. p. 347.)

241. *G. True Scirrhus and Carcinoma* of the heart are, according to Otto, still doubtful. Where the evidence of either has been most conclusive, there has also been scirrhus or carcinoma of other parts. Open carcinoma of the heart can hardly exist, as death will take place before the disease can proceed to this stage. Most writers, especially foreign pathologists, have confounded true carcinoma with fungoid or encephaloid disease; and cases have been recorded as examples of the former, when they were really instances of the latter. Of this kind are the cases adduced by Laennec, Velpeau, Andral, Cruveilhier, Ollivier, &c.—Bayle and Cayol never met with an instance of scirrhus of the heart. I have seen scirrhus in the lungs and *pericardium* in one case, and in the pleura and pericardium in another, scirrhous and carcinomatous disease having long previously existed in other parts of the body. M. Billard found, in an infant only three days old, three tumours embedded in the heart, possessing the characters of scirrhus. I doubt, however, their being actually scirrhus. M. Recamier observed the heart partially converted into a substance resembling the skin of bacon in a person who also had cancerous tumours in the lungs. Cases of a more doubtful description are recorded by Carcassone and Duchateau. Rullier states that he found cancer in the heart of a person who had this malady in other organs; and a somewhat similar instance is recorded in the *Révue Médicale* (t. i. 1824, p. 272.).

242. *H. Melanosis* has also been found in the heart and pericardium; but, in all the instances of this kind on record, this production has existed also in other parts. — As to the *Treatment* of adventitious productions in the heart, it is unnecessary to offer any remarks.

243. ix. Of Polypous Concretions in the Cavities of the Heart. — Bartoletti and Pisini were the first to impose the name of *polypi* on those concretions of lymph and fibrine which are sometimes found in the cavities of the heart and large vessels after death. Kerkring first contended that these concretions were different, in their nature and mode of formation, from polypi of the uterus and nasal fossæ, to which Bartoletti and Pisini had likened them. But with Kerkring originated the distinction of them into *false* and *true polypi*, — the former consisting of a *post mortem* coagulation of the fibrinous part of the blood, the latter presenting a consistent cellular or organised appearance, and being formed during the life of the patient. This distinction was first questioned by Morgagni, who denied the existence of true polypi of the heart, and in this opinion he was followed by Lieutaud, Pasta, and others. On the other hand, Manget, Malpighi, Pechlin, Peyer, F. Hoffmann, and Fantoni maintained that the polypous concretions found in the cavities of the heart were to be regarded as the more immediate cause of death, and not as having been formed at the time of death. The opinions of pathologists, however, remained long divided on this point, until Corvisart, Testa, Burns, Bertin, Kreysig, Laennec, and others investigated it somewhat more closely, and ascertained that, although these concretions occasionally form about the time of death, or immediately afterwards, there are others of a different kind, which are produced during the life of the patient, and occasion very severe symptoms referrible to the heart, but not of a kind which generally admit of a precise diagnosis.

244. *A. Of the Formation and Kinds of Cardiac Polypi.*—Polypous concretions are most frequently observed in the right cavities of the heart, and oftener in the auricles than in the ventricles. This is explained by the circumstances which favour their production; especially the stasis of the blood in the auricles, the state of the blood when it reaches the right auricle, and the extension of inflammatory action from the venous trunks. These three principal causes are especially concerned in the production of *three kinds* of concretions. — In the heart as well as in the veins, and even in the arteries, the fibrinous parts of the blood may concrete — 1st, from a condition purely mechanical; — 2dly, from an altered state of the blood itself, especially from the passage of morbid matter into it; — and, 3dly, from inflammatory action.—Each of these, as being especially concerned in the production of three varieties of cardiac polypi, requires a detailed consideration.

245. *a. Simple fibrinous concretions — the false polypi* of former writers — are frequently found in the right cavities of the heart, and sometimes extend into the vena cava and pulmonary artery. They are occasionally entangled in the columnæ carneæ; but they have no organised or intimate connection with any part of the internal surface of the heart with which they are in contact. They consist of an inorganised accretion of the fibrinous and albuminous parts of the blood; are of an uniform colour, easily torn, and generally met with in patients who have died of chronic diseases; characterised frequently by a deficiency of the red particles of the blood, or, in cases of marasmus, great debility, or cachexy, and which have been accompanied by obstacles to the circulation, as from disease of the valves and orifices of the heart. These concretions may commence during the last moments of existence, or immediately upon dissolution. In cases of mechanical obstacle to the circulation through either the heart or lungs, the fibrinous parts of the blood may concrete in the right side of the heart so as to prevent the continuance of its action. The same result may also follow the remora or stasis of blood in the right auricle and vena cava, consequent upon extreme depression of the powers of life, or upon prolonged syncope, &c.; the concretion thus formed preventing the restoration of the heart's contractions. Under such circumstances, this variety of concretion may be the proximate cause of death. although formed so shortly before, especially in diseases of the heart, and during extreme vital prostration.

246. *b. Fibrinous concretions from the passage of morbid secretions into the blood.* — During languid states of the circulation, or when the fibrinous parts of the blood are disposed to coagulate, the passage of pus, or of the more consistent morbid

secretions, into the veins, occasionally determines or gives occasion to this act; the morbid matter carried into the circulation being the nucleus around which the fibrine concretes, especially in the situations, as the right side of the heart, most favourable to this occurrence. When a partial coagulation of fibrine is thus occasioned during the venous circulation, the concretions, at first small, often become entangled in the fleshy columns of the right side of the heart, and undergo changes arising — 1st, from the concentric deposition of additional layers of fibrine, as in the cavities of aneurisms; — 2dly, from their age or duration; — and, 3dly, from the effects they produce on the parts with which they are in contact. — (*a*) Upon dividing these concretions, the appearance of concentric layers of fibrine becomes manifest; and in the centre, either pus, or tuberculous matter, or a substance resembling a minute coagulum, is observed. — (*b*) The colour and consistence of these concretions depend chiefly upon their age. In the more recent cases, they nearly resemble those already described, and are soft or easily torn. Those of longer duration are more evidently disposed into concentric layers, more firm and fibrous, and generally of a paler tint; but varying from a greyish colour, to a greyish red or flesh-colour. — (*c*) When they are of considerable size, or of long duration, they appear to have compressed the fleshy columns in which they are entangled, and ultimately they become adherent, in one or more points, to the internal surface of the heart, in more immediate contact with them. This adhesion is manifestly owing to the irritation they have occasioned in this surface, and at these points, and to the consequent exudation of lymph, by which they become agglutinated, and more or less closely adherent. — (*d*) In this variety of concretion, there are neither blood-vessels nor vascular connections with the surface to which they become adherent, — circumstances readily explained by the modes of their production, and of their consecutive agglutination. At the same time, such adhesions are merely contingencies, and very frequently do not occur, especially in the more recent concretions. The form and size of these concretions also vary remarkably.

247. *c. Polypous concretions consequent upon internal carditis.* — Whilst the two preceding varieties of concretion are generally observed in the right side of the heart, that about to be considered is most frequently met with in the left; inflammation attacking this side of the organ, oftener than the right (§ 65. 68.). — This variety varies much in size and in firmness. It may not much exceed the granulations or excrescences described above (§ 66.), or it may be so large as to nearly fill one of the cavities. In its more recent state, it is generally amorphous, resembling concrete lymph, or the buffy coat of the blood, glutinous, and slightly adherent to some part of the internal surface, or of the fleshy columns or tendons of the valves. But, when it has been of considerable duration, it is more firm, fibrous, or cellulo-fibrous, in its structure, and more firmly adherent to the internal membrane, with which it seems as if continuous. In some cases, blood-vessels may be traced through this variety of concretion, and their communication with those of the heart's internal surface may be demonstrated. When this form of concretion is of considerable size, there is every reason to suppose that it is not altogether, or even chiefly, formed of the lymph exuded from the inflamed internal surface, as the quantity of lymph thus effused cannot be more than will give rise to the granulations, excrescences, or vegetations, already noticed (§ 66.) But the lymph thus exuded, during a languid circulation, or states of the blood favouring coagulation, attracts and disposes the fibrine to concrete around it; and polypi of great size, sometimes disposed in layers, as the second variety, may thus be formed. — The firmness and cohesion of these polypi vary considerably, but their cohesion has no reference to the intimate nature of their connection with the heart's surface; for, in some cases, where the polypus was very soft, vessels could easily be traced from the heart into it, and these so large as to admit of injection (RIGACCI, in *Bullet. des Scien. Méd.* Sept. 1828; BERTIN, *Traité des Mal. du Cœur, &c.* p. 448.); whilst in other instances the polypus has been firm, intimately adherent to, and apparently forming a continuous structure with, the surface of the heart, and yet the existence of blood-vessels was not apparent. That this variety of concretion originates in inflammatory irritation of some part of the internal surface of the heart, is proved by the history of the cases in which it has been met with, and by the appearances exhibited upon dissection. — From the foregoing division and description of these productions, the diversity of opinions which has long existed as to their formation will be readily accounted for.

248. *B. Of the Signs of Cardiac Polypi.* — About the end of the last century, polypi of the heart were considered a frequent occurrence, and many of the disorders of respiration and circulation were attributed to them. J. J. ROUSSEAU took a journey to Montpellier to be treated for this disease, and, according to M. BOUILLAUD, upon foot, which he could not of course have done if he had been the subject of it. — It is evident that the symptoms will vary according to the situation, size, and origin of these formations — to the degree to which they extend into or fill up the cavities of either side of the organ. MALPIGHI, SENAC, SAUVAGES, and BURSIERI have entered very fully into the diagnosis of these concretions, but no reliance can be placed upon what they have adduced respecting it. Even the more recent observations of LAENNEC, HARTY, and others have not much advanced our knowledge. M. BOUILLAUD remarks, that it is necessary for them to have attained so great a size as to notably impede the circulation, before they can be possibly recognised during life. They do not, however, equally impede the flow of blood through the cavities in all the situations in which they may be placed. The concretions which are attached to the valves, or to their tendons, the other circumstances being the same, cause the greatest interruption of the circulation. When they occupy the right cavities, as most frequently is the case, the blood is sent in diminished quantity to the lungs, and accumulates in the venous trunks, causing congestion of the liver, brain, abdominal viscera, &c.; effusions into shut cavities and cellular parts; and asphyxy from deficient aërification of the blood, if the supply of blood to the lungs be much lessened. When they form in the left side

of the heart, the phenomena are, in some respects, the same; but congestion of the lungs is a necessary consequence, with dyspnœa, effusions into the bronchi, or substance of the lungs, &c.

249. According to Laennec, the sudden supervention of an anomalous, confused, and obscure pulsation, in a patient who previously had presented a regular action of the heart, should lead to the suspicion of a polypous concretion; and if this disturbance takes place on one side only, this indication is almost certain. M. Bouillaud considers that the concretions consequent upon internal or external carditis, are indicated by tumultuous pulsations of the heart, with a dulness or obscurity of the attendant sounds, or with a simple, or hissing bellows sound; by oppression, dyspnœa, or orthopnœa, and extreme anxiety, followed by venous congestions, and leipothymia; and by coma, stertorous breathing, convulsive movements, an indistinct and very small pulse, and coldness of the extremities. When these phenomena are manifested in the course of an acute disease of the heart, particularly during internal carditis, in which there had previously been but little irregularity and oppression of the respiration and circulation, the existence of a polypous concretion is very probable, and especially if the sounds of one or more of the cavities are much diminished or obscure. — In chronic diseases of the heart, attended by habitual dyspnœa, the occurrence of an insupportable orthopnœa and anxiety, with obscuration of the sounds, restlessness, coldness and lividity of the face and extremities, and occasionally vomiting, also indicate the formation of concretions, especially if these symptoms have supervened without an obvious cause; and in this case it is very probable that the concretions exist in the right cavities.

250. C. The *Prognosis* and *Treatment* of polypous concretions require but few remarks: the former is always extremely unfavourable. Indeed, it is doubtful whether recovery ever takes place from them, — at least, when the indications of their existence are tolerably conclusive. M. Bouillaud, however, takes a more favourable view of the issue of such cases; and thinks that the more recent, and those which are not of large size, may be dissolved. This writer and M. Legroux suppose that attempts should be made to *prevent* the formation of these concretions in diseases of the heart — both in those which consist chiefly of interrupted circulation, and in inflammatory action. With this view they recommend small bloodlettings from time to time, and diluents. It is probable that the disposition of the fibrinous portions of the blood to concrete may be counteracted by the exhibition of mercurials, by the liquor potassæ and the subcarbonates of the alkalies, and particularly by the sub-borate of soda. This last substance I have found the most certain in preventing the coagulation of fibrine, and in dissolving lymph; and it may, therefore, be prescribed with advantage, not only in the inflammatory diseases of the heart, but also where here is reason to suspect the formation of polypous concretions.

251. x. Of Ruptures of the Heart. — *A. Seat and History of, &c.*—Rupture of the heart was first observed by Harvey. Lancisi and Morgagni showed that instances of sudden death were frequently owing to this cause. As examinations after death became more frequent, cases of this occurrence were more commonly met with; and at the present epoch of pathological research they are by no means rare. — Morgagni (*Epist.* xxvii. 10.) remarked that rupture of the left ventricle is more common than that of the right; and that this latter is more frequent than rupture of the auricles: this is confirmed by the particulars of the cases which have been since recorded. M. Ollivier states, that, out of 49 instances, the rupture was seated in the left ventricle, in 34; in the right ventricle, in 8; in the left auricle, in 2; and in the right auricle, in 3; and that, in 2 cases, both ventricles presented several ruptures. The results are, however, different in respect of ruptures occasioned by external violence. In 11 instances of this description, the right cavities were torn in 8; and the left in 3. In these 11 cases, the auricles were torn in 6.

252. In the above 49 instances of spontaneous rupture, the apex was found to be its seat, in 9; this lesion in the others being nearer the base of the organ. The directions of the lacerations were various: in some the laceration was transverse or oblique, — in others it was longitudinal or in the direction of the fibres, or of the axis, of the organ. In certain cases, it was extensive on the external surface, and very small internally. In other instances the reverse was observed. The laceration may occur obliquely through the parietes, and resemble a sinus, as remarked by Morgagni. It may even be incomplete, some of the stretched fibres still remaining and concreting the opposite edges (Rostan). It may also resemble the perforation made by a bullet. It may, moreover, involve only one or two of the muscular layers, without penetrating into the cavity; and it may be limited to a few fasciculi of fibres, or to the fleshy columns, or even to the valves. — When there is no apparent alteration of the tissue at the place of rupture, it is difficult to determine whether or not it has taken place from within outwards, or in the opposite direction. — The most singular circumstance, in the history of this lesion, is the occasional occurrence of two or more lacerations, in different degrees, in the same heart. M. Ollivier, upon examining into the particulars of the most authentic cases, found eight in which there were several ruptures, either in the same ventricle or in both. M. Rostan detected two lacerations in the left ventricle; Morgagni, three in the same situation; Portal, the same number in the same place; Dr. Ashburner, two in the left ventricle, and one in the right; M. Blaud found two penetrating the ventricles, two involving only the superficial layer of the left, and one the external layer of the right ventricle; and M. Andral observed five in the left ventricle, and a perforation of the stomach in the same patient. — Frequently, when the substance of the organ is torn, some of the fleshy columns corresponding to the rupture are also torn. In some instances the fleshy columns are alone torn, the parietes of the ventricles remaining entire. In this case the derangement of the circulation becomes extreme, especially if the tendinous cords attached to the free margin of the valves are ruptured (Ollivier). Instances of this kind are recorded by Corvisart, Laennec, Bertin, Adams, and others. Ruptures of the heart have

been arranged as follows by Dezeimeris:—1st. Rupture from external violence; — 2d. Spontaneous rupture without previous lesion of the tissues of the organ; — 3d. Ruptures consequent upon dilatation; — 4th. Ruptures with *probable*, but not with demonstrable, lesion;—5th. Ruptures owing to softening of the heart; — 6th. Ruptures from abscess;—and, 7th. Ruptures caused by ulceration, or perforation of the heart. M. Ollivier has adopted a somewhat similar plan to the foregoing in his treatise on this subject.

253. *a. Rupture of the Heart without previous Lesion*, or without demonstrable lesion, is comparatively rare. In the cases recorded by Ploucquet and Fischer the rupture was preceded by severe pain, continued or remittent, in the left shoulder, and about the margin of the left shoulder-blade, and shooting down the arm, and left side of the thorax, and attended by a sense of laceration, pressure, and anxiety at the præcordia and epigastrium, sometimes with numbness and prickings in the shoulder and arm. — In other instances, as in those published by Portal, Baron, and Andral, death has occurred without any previous ailment, excepting dyspnœa, which was observed only in the case recorded by Portal.

254. *b. Rupture consequent upon Narrowing of the Orifices*, with or without hypertrophy or dilatation of the cavities of the heart, is a more frequent occurrence than the foregoing. Morgagni has adduced several instances, in which the laceration was consecutive of alterations at the origin of the aorta. Haller has cited a similar case; and others have been recorded by Portal, Rostan, and Dezeimeris. In a case published by Chaussier, in which death occurred during a dispute, the aorta was found constricted at its origin by a cartilaginous tumour which surrounded it. There can be no doubt that an obstacle to the circulation at the heart's orifices will favour rupture of the cavity behind it; and that laceration may occur, although the parietes of the cavity are hypertrophied. Instances of this latter occurrence have been published by Morgagni, Rostan, and others. Morgagni supposed that, when the rupture is connected with hypertrophy, it takes place in that portion of the parietes which is the least thickened and resistant. But this is not always the case; for the rupture has been observed in the most hypertrophied part. M. Chomel supposes that, when this has occurred, the ventricle has been almost equally thickened and resistant throughout, and that the part torn, although the most hypertrophied, has been actually the weakest. If the sole cause of rupture were a distending force, or even the resistance furnished by the contents of the cavity to the contraction of its parietes, in forcing the contents onwards, then might tbe laceration take place in the weakest part; but the rupture does not always occur in this way; for it is reasonable to infer that the same circumstances as occasion increased action and consequent hypertrophy, will sometimes produce laceration, when their increase is rapid, or the obstacle to the circulation through the cavities of the heart insurmountable; and that hence the muscular structure is torn by its own excessive action at the very part where the contraction is most energetic.

255. *c. Dilatation* of the cavities might at first appear more frequently connected with rupture, than hypertrophy has been found to be, laceration of the parietes following the extreme or sudden dilatation of them; but this connection has been even less frequently observed than the preceding. Instances of it have, however, been adduced by Morgagni, Martini, and Schæffer. Local or partial dilatation might also appear frequently to terminate in rupture of the dilated part: but this is also a rare termination, as the adhesion of the part to the pericardium, or the formation of fibrinous layers in the interior of the sac, prevents it from being so easily torn as it otherwise would be. M. Ollivier remarks, that of nineteen instances of local dilatation, rupture occurred only in the three cases recorded by Galeati, Penada, and Bignardi.

256. *d. That Rupture should be favoured, or occasioned, by partial or general Softening of the Substance of the Heart*, will be readily conceded; and several cases are recorded in illustration of the occurrence.—In all these the softening was great, although varied in its characters: in some it has been denominated *gangrenous*, particularly by the older writers; in others *apoplectic*, by Cruveilhier (*Anat. Path.* fasc. iv.); and in others *gelatiniform*, or *senile*, by Blaud. Of the second of these varieties, instances have been adduced by Tengmalm, Corvisart, and Rochoux. M. Ollivier states, that the thesis of this last writer contains several cases of this kind of rupture.— Instances of the third variety of softening terminating in laceration are published, in the places referred to below, by Hazon, and others. In a case by S. Frank, this alteration appears to have arisen from lesion of the *nervi vagi*; and in one by Hodgson, the softening and atrophy seem to have followed obliteration of the coronary arteries.— Rupture has also been occasioned by the softening attendant upon fatty degeneration of the heart (§ 224.). Morgagni, Schmucker, and Adams, have recorded cases in which this form of softening had terminated in laceration.

257. *e. Abscess in, or Ulceration of, the Muscular Structure of the Heart has also been found to have terminated in Rupture.* — In cases recorded by Morgagni, Portal, Brera, Langlade, and H. Cloquet, *ulceration* had partially penetrated the parietes of one of the cavities, the remaining layer being torn by the distension, or resistance, of the contents of the cavity. Instances of *abscess* of the structure of the organ recorded by Erdmann and Mott, and quoted by Dezeimeris, terminated in a similar manner to the foregoing, — the termination admitting of the same explanation.

258. *f. The Rupture may be partial, or confined to one or more Layers, or muscular Fasciculi, or tendinous Cords of one or more Cavities*, as stated above, and as shown by Corvisart, and confirmed by Laennec, Bertin, Adams, and others. — In the three cases recorded by Corvisart, the rupture appeared to have been occasioned by violent physical efforts. Bertin detected rupture of one of the fleshy columns of the right ventricle, and attributed it to violent fits of cough. Laennec found one of the tendinous cords attached to the free margin of the mitral valve torn across; and Dr. Cheyne met with another instance of rupture of one of these cords in a person affected with dilatation and hypertrophy of the left ventricle. — Cases in which rupture of the *fleshy columns* and *tendinous cords* have occurred, have

likewise been observed by Bouillaud, Townsend, and others.

259. *g. Ruptures of the Valves* are not infrequently met with, as a consequence of fragility arising from induration and ossification, or from softening caused by inflammatory action; but previous disease is not always necessary to the production of this rupture, especially when it is produced by external violence, or by sudden and violent physical efforts. When, however, it is consequent upon slighter grades of these causes, or upon mental emotions, previous disease of the valves, or of the orifices, or of the internal surface, of the heart may be inferred; otherwise they would have been inadequate to its production. If the rupture of the valve be partial, the patient may live a considerable time afterwards; but extensive chronic disease will be the result, owing to the local irritation, and to the imperfect function of the valve, particularly further structural change of the ruptured valve, dilatation, or dilatation with hypertrophy, of the chambers of the heart, &c. When the rupture is extensive, and has been favoured by existing structural change, death either follows almost instantly, or takes place in a short time. When the rupture is partial, the patient may live for a considerable time, with the symptoms of insufficiency of the valves (§ 76. 198.).

260. *F. Rupture of the Heart from external Violence* is not a rare occurrence. Contrary to what is observed in respect of spontaneous rupture, the laceration occasioned by external force is more frequently seated in the right, than in the left, side of the organ; and much more commonly in the auricles, than in the ventricles. As M. Dezeimeris has argued, it is very probable that the mode in which the rupture is produced by external injury, depends much upon the nature and seat of the injury. When the region of the heart, or the thorax, is the seat of the external violence, the rupture takes place in the cavities possessed of the weakest parietes, and in the most yielding points of these: but when the injury is of a kind to prevent the heart from evacuating its contents, as in the case of a carriage-wheel passing over the trunk, or of any heavy body pressing upon the aorta, the muscular efforts of the ventricles to expel their contents, may occasion either a partial or complete rupture of them, or of the vessel at some point between the heart and the part pressed upon.

261. *B.* The *Causes of Rupture of the Heart*, especially the most material, and those connected with the pathological states of the organ, have been already stated, and explained under distinct categories. There are, however, various other causes which determine, aid, or accelerate these in their operation. Violent mental emotions, particularly anger, fright, terror, unexpected disappointments, distressing intelligence suddenly communicated, anxiety, &c.; sudden and violent muscular efforts, and laborious or prolonged physical exertions of any kind, particularly in constrained positions. The act of coition and straining at stool have often occasioned rupture; a very large proportion of the cases of it on record having been attributed to these causes. M. Ollivier states that rupture of the heart occurs more frequently in men than in women; but this is not satisfactorily determined. It is certainly more common in persons far advanced in life, than in the young. M. Blaud considers the rupture that takes place in old age, as generally the consequence of softening of the heart. Several cases recorded by him, and by other writers, confirm this; and those adduced by Cruveilhier and Smith further show, that softening terminating in rupture of the left ventricle is often accompanied, in old persons, with great accumulation of fat on the surface of the organ.

262. *C. Symptoms* and *Diagnosis.*—*a.* The cases hitherto recorded throw but little light on the diagnosis of this lesion. Some of these have furnished proofs of disease of the heart for a longer or shorter time: whilst others, up to the hour of death, had complained of no symptom indicative of any affection of the heart or large vessels. In the instances recorded by Ploucquet, Olmi, Charpentier, and Fischer, the patients complained, for a short time before death, of a violent pain in the left shoulder, extending to the arm, and occasionally to the whole side; attended, especially at last, with more or less numbness, and characterised by exacerbations and slight remissions. In some cases, inexpressible anxiety and pain have been felt in the præcordia and epigastrium, with cold extremities and cramps, shortly before dissolution. In the majority, rupture has produced instant death; but in some this has not been the case. In the instance adduced by J. Frank, life was prolonged twelve hours, probably from a coagulum filling up the laceration for a time. In a case recorded by Rust, the rupture was produced by the passage of a carriage-wheel over the chest, and was seated in the right auricle; yet the patient survived fourteen hours.

263. In most of the cases in which the rupture is preceded by violent pain, M. Ollivier thinks that it is produced gradually, from the successive laceration of several layers or fasciculi of muscular fibres; and that the pericardium becomes only gradually distended by the effused blood. Where the laceration and aperture are at once large, a copious effusion instantly occurs, fills the pericardium, and abolishes the contractions of the organ.

264. *b.* When the rupture is seated in the *partitions between the auricles or ventricles*, a fatal result may not very rapidly occur. In this case, the venous may be mixed with the arterial blood; although this may take place only to a small extent.—*c.* In the three cases of *rupture of the fleshy columns* detailed by Corvisart, a sudden oppression and sense of impending suffocation was the first symptom complained of. The pulse became unequal, irregular, and intermittent; and the pulsations of the heart confused. This state of distress and anxiety may continue for some days, before it terminates in death; or it may endure much longer, and be accompanied with various signs of organic disease of the heart.—*d. Rupture of the valves* will necessarily be attended by much irregularity or disorder of the circulation, and by a simple, or hissing, or musical bellows sound. (Bouillaud, Farrall.)

265. As the *diagnosis* of rupture of the fleshy columns and valves of the heart, in the present state of our knowledge, is very imperfect; and as the signs of rupture of the parietes of one of the cavities are equivocal; nothing can be adduced as

to the *Treatment* of these lesions. Indeed, in most instances, medical interference will be quite unavailing; and even as much mischief as benefit may result from it.*

266. xi. Alterations of the Bloodvessels of the Heart.—The coronary vessels are more or less enlarged in hypertrophy of the heart, and diminished in atrophy. Some writers have supposed that the smallness of the vessels in the latter lesion is actually the cause of it; but the state of the vessels is solely dependent upon the nutrition of the organ. Portal (*Anat. Méd.* t. iii. p. 74.) found the coronary veins dilated and varicose; and the larger trunks have contained polypous concretions (Kreysig). The coronary trunks, both veins and arteries are always very much, and progressively, enlarged with the accession of age, as shown by M. Bizot. The most common alterations, however, of the cardiac vessels are cartilaginous and ossific formations in the *arteries*. These, especially the ossific deposition, may consist merely of small isolated patches, or they may nearly or altogether surround the vessel. Ossification may extend along the greater part of an artery, or to two or more. Generally, the canal of the vessels is uninterrupted, although the parietes have become quite inert. Cases, however, have occurred in which the canal has been obliterated. Instances of extensive ossification of the cardiac arteries have been recorded by Parry, Ring, Portal, Hodgson, and others; and have been usually found associated with softening, flaccidity, or some other change in the nutrition of the organ. Angina pectoris has been supposed to depend upon this change; but numerous instances of ossification of the coronary arteries have been met with without this complaint, or, indeed, any symptom referrible to the heart, having existed.

267. xii. Communication between the Sides of the Heart. — This lesion is most frequently congenital, or the result of malformation, or imperfect development of the organ. It occasionally increases suddenly about the period of puberty. M. Bertin (p. 436.), and M. Bouillaud (t. ii. p. 564.), however, believe that it is not unfrequently a consequence of ulcerative perforation; whilst M. Louis maintains that it very rarely arises from this latter cause. The communication may exist through the interauricular, or through the interventricular partition, or through both at the same time. Bouillaud remarks that, in many cases, the *opening in the interauricular partition* is a persistent state of the *foramen ovale*; but, in others, that it is consequent upon ulceration, particularly when it occupies a situation different from that in which the oval foramen is always found, and when there are more than one perforation. The communication in this situation is generally by a rounded opening, with smooth, sometimes thick and tendinous, margins, commonly of from four to six lines in diameter, but sometimes of nearly double this size. The *perforation of the interventricular partition* is found in various situations, but most frequently at the junction with the partition of the auricles, and towards the insertions of the pulmonary artery and of the aorta. The form of the openings is commonly round, and the diameter is the same as those of the interauricular partition, the margins presenting the same polished and fibrous appearance.

268. The state of the valves and orifices of the heart, in cases of communication between the opposite cavities, is important. Of fifteen cases, detailed by Bouillaud, the valves were indurated, thickened, corroded, or perforated in twelve; and, in ten of these twelve, the orifices to which these valves belonged were more or less contracted. In eight of the twelve cases, these lesions affected the right; in three, the left valves and orifices. In five of the eight cases, they were seated in the pulmonary valves; in two, in the tricuspid valve; and, in one, in both the pulmonary and tricuspid. Of fifty-three cases of cyanosis noticed by M. Gintrac, similar lesions to the above were found in twenty-seven; and in all these latter, they were seated in the right side of the organ; twenty-six being at the orifice of the pulmonary artery, and one only in the auriculo-ventricular orifice. The contractions of the orifices and lesions of the valves, in these cases, did not differ from those described above (§ 67,213.). The greater frequency of the narrowing of the right orifices, particularly that of the pulmonary artery, in cases of communication between the opposite cavities, is deserving notice. This lesion M. Louis considers to be congenital. M. Bouillaud believes it to be, in some cases, caused by inflammatory action.

269. In eleven of the fifteen cases given by M. Bouillaud, the heart was enlarged, dilatation, with hypertrophy, having existed in the right side. Dilatation of the right auricle was observed in ten cases; and, in most of these, the parietes of the auricle were also thickened. Hypertrophy of the right ventricle was met with in ten cases; and, in four of these, the hypertrophy was concentric. The left side of the heart presented nothing anormal, excepting the induration of the valves, and narrowing of the orifices, in the three already noticed (§§ 268.). In the twenty cases reported by M. Louis, nearly the same appearances as in those of M. Bouillaud were observed. Dilatation of the right auricle existed in nineteen, six times with hypertrophy, and twice with thinning of its parietes. Dilatation of the right ventricle was observed in ten, hypertrophy in eleven, and both dilatation and hypertrophy in five instances; whilst, on the left side, dilatation of the auricle occurred thrice, that of the ventricle four times; and hypertrophy of the former twice, and that of the latter thrice only. (*See* Blue Disease, § 8.)

270. In some instances, communication between the opposite sides of the heart is associated with other *lesions of malformation*; as the connection of the aorta with the right ventricle (Ribes), or with both ventricles (Louis), the persistence of the ar-

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* The only instance on record, showing the possibility of recovery, more or less partial, from rupture of the heart, has been published by Rostan; but some mistake may have existed as to the morbid appearances. The case is, however, very interesting. — A woman had experienced, fifteen years previously to death, a violent pain in the præcordia and epigastrium, extending to the back, and returning at intervals. She was afterwards subject to palpitations, followed by syncope. Her death was sudden. The pericardium contained blood effused in its posterior part, but was adherent to the heart anteriorly by several albuminous layers. On removing it, an irregular rupture, an inch and a half in length, and quite recent, was found; but, to the left of this, and at a distance of six lines, the substance of the organ was destroyed, and replaced by a fibrinous concretion, entirely similar to those found in aneurismal sacs, and intimately connected with the structure of the heart. The ventricle was thinned in this situation. The latter appearance was attributed to a rupture which had taken place at a long bygone period.

terial canal, &c. (See BLUE DISEASE, § 8.) The state of the *pericardium* has been noticed in a few only of the cases of this description; and in these alterations depending upon chronic pericarditis, and effusion of a serous fluid, were chiefly observed.

271. The *symptoms* of the lesion under consideration are generally equivocal; for, as it is generally associated with disease of the valves and orifices, and with dilatation and hypertrophy of the corresponding chambers of the organ, it becomes difficult to separate the phenomena actually depending upon these lesions from those arising from the communication between the opposite cavities. The palpitations, dulness on percussion of the præcordial region, the purring tremor, the bellows or saw-sound, the faintings, sinkings, oppression, &c., the irregularity and smallness of the pulse, the venous and serous congestions, &c., observed in these cases, are manifestly owing to these associated lesions. That more or less admixture of the venous and arterial blood results, in consequence of the communication, must be admitted. M. LOUIS thinks that it takes place chiefly on the entrance of the blood into the communicating cavities, and on the departure of the blood from these cavities, when the natural orifice is more or less constricted.

272. Blue discolouration of the skin (See BLUE DISEASE) has been attributed to this communication; but it is not always observed, and it is rarely universal. Sometimes it is not remarked, even in the countenance, till the last period of the patient's life. This change of colour is to be attributed as much to the obstacle to the circulation of the venous blood, as to the communication between the opposite sides of the organ; and this communication has generally existed a considerable time before the health has been very remarkably affected. The symptoms assigned to this alteration, particularly blue discolouration, leipothymia, great sensibility to cold, oppression and suffocation in the thorax, are chiefly an aggravation of those observed in other diseases of the heart, and are often wanting in this. According to M. LOUIS, the symptoms most to be depended upon is, a sense of suffocation, occurring sometimes periodically, but always frequently, accompanied or followed by leipothymia, and with or without blueness of the skin, and occasioned by the slightest causes. Admixture of the red and dark blood, even to a considerable extent, at least in appearance, seems not incompatible with a tolerably prolonged existence, nor with development of the intellectual faculties. It has no manifest effect upon intercurrent diseases. The existence of a communication between both sides of the heart, even when it becomes somewhat manifest, is not so dangerous as the blue disease. The former may not give rise to serious phenomena; the latter indicates that the communication is accompanied with a dangerous interruption of the circulation through the right side of the heart, or some equally dangerous lesion. As to the *treatment* of this alteration, I cannot add any thing to what I have stated in the *article* BLUE DISEASE (§ 12.).

273. VI. DISPLACEMENT AND PRETERNATURAL POSITIONS OF THE HEART. — The situation of the heart is sometimes anormal, owing to *malformation*; but my limits will not admit of an account of the various alterations of the *position*, and of the *form*, of the organ, observed as a *congenital vice.* Those who are desirous of obtaining information on this subject will find it in the works of HALLER, MECKEL, OTTO, BRESCHET, BOUILLAUD, and others, referred to at the end of this article. The *position* of the heart may be anormal in several ways, from malformation; it may be placed externally to the thoracic parietes, or internally in the abdominal cavity, below the diaphragm, or in the right side of the thorax; and the vice in situation may be associated with other anomalies, either in the circulating system, or in the position and form of the adjoining viscera, or in both. These, however, are matters calculated rather to excite curious speculation than to lead to practical inferences. But with *true displacements* of the heart, or *alterations of position after birth*, the case is different. These displacements arise from diseaes, or injury of the organ itself, or of adjoining parts; and the extent of the alteration, and the manner or mode of its occurrence, in such cases, are matters of real practical importance.

274. *a*. The apex of the heart may be turned altogether to the *left side*, without further alteration of position, or it may be raised at the same time somewhat higher in the thorax, by excessive hypertrophy of the organ. — *b*. The heart may be *pushed downwards*, by an aneurism of the arch of the aorta, or by some other tumour pressing upon it. Cases of this kind have been recorded by LANCISI, MORGAGNI, and OTTO. — *c*. True *prolapse*, or dragging down of the organ, from increased weight, and weakness of the parts supporting it, is very rare; but it has been noticed by LEIDENFROST, SENAC, ZULIANI, PACHIONI, OTTO, and TESTA. In this form of displacement, the diaphragm is carried before the heart, a convex tumour thereby invading the abdomen. — *d*. The heart may be pressed *unusually high* in the thorax, or towards the neck, by enlargement of the abdominal viscera, by large hydatid cysts, by inordinate distension of the stomach or colon, by excessive dropsical effusion into the peritoneum, by tumours of the spleen, liver, or other parts, and by aneurism of the descending aorta. Instances of these occurrences have been adduced by the writers referred to hereafter. One of the most common causes of this displacement is aneurism of the descending thoracic, or of the abdominal, aorta. In such cases, a double pulsation is felt in the aneurismal tumour, as in those recorded by Drs. GRAVES and STOKES.

275. *e*. The heart is not unfrequently *pushed over to the right side* by various alterations in adjoining viscera. It must, however, be recollected that this organ may be situated towards the right side, owing to original conformation, or to transposition of some or of the whole of the viscera. Instances of this are, however, very rare; but several have been adduced by the writers mentioned above (§ 273, 274.). The alterations causing the displacement of the heart to the right side, are, destruction or condensation of the right, and hypertrophy of the left lung, as in the case recorded by Dr. ABERCROMBIE; dropsical effusion into, or encysted dropsy of, the left thorax; pneuma-thorax of the left side; collections of pus or of blood in the left pleural cavity; tumours of various kinds; diaphragmatic herniæ; and curvatures of the spine. Dr. STOKES mentions a case in which the heart was thrust by a blow of a wheel to the right side, where it continued long afterwards to pulsate.

276. Several instances of displacement of the heart to the right thorax have been observed by me. In all

these, it arose from the effusion of fluids, of various kinds, in the left pleural cavity: in one case, from the effusion of blood from external injury, with fracture of the ribs; in three, from pleuritis of the left side, terminating in serous effusion; in two, from empyema; and in two, from pneumo-thorax. In one of these latter, consequent upon tubercles, the patient had not been long ailing. The passage of air into the left pleural cavity was sudden and rapid. I saw him within two hours from the commencement of the distress consequent upon it, and immediately detected the pulsation of the heart on the right side.

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HEPATITIS. — See Liver, Inflammation of.

HERPETIC ERUPTIONS. — Syn. *Herpes* Ἕρπης (from ἕρπειν to creep), Galen, Dioscorides; *Formica*, Avicenna. *Cytisma Herpes*, Young; *Herpes*, Sauvages, Linnæus, Willan; *Serpigo*, Auct. var. *Ecphlysis Herpes*, Good; *Dartre, Herpe*, Fr.; *Die Flechte, Zittermal*, Germ.; *Erpete*, Ital.; *Vesicular Tetter, the Serpigo*, Fret.

Classif. — 4. *Class*. 8. *Order* (*Cullen*). 6. *Class*. 3. *Order* (*Good*). 6. *Order*. 3. *Genus* (*Bateman*). III. Class, I. Order (*Author*, in *Preface*).

1. Defin. — *An eruption of vesicles, in distinct irregular clusters, upon inflamed bases which extend somewhat beyond the margin of each cluster; attended by tingling, concreting into lamellar scabs, and not contagious.*

2. A genus of eruptions, characterised as just stated, has been very accurately described by Willan, Bateman, Biett, and Rayer, under the name of *herpes*. This designation represents, according to the above definition, affections in many respects different from those comprised under it by Lorry, Turner, Alibert, and others; and is employed by the former writers in a more rigorous sense. Yet the several *species* enumerated by Bateman and Rayer are manifestly too numerous, some of them being merely varieties arising out of the forms which the clusters of vesicles assume, and of the situations in which they are often observed. In this opinion, I am supported by M. Biett and Dr. A. T. Thomson, who have arranged them accordingly.

3. *Herpes* is an inflammatory affection, chiefly of the vascular rete of the skin, causing the effusion of a thin fluid, which elevates the cuticle into groups of small vesicles. This affection occurs generally in circumscribed patches, the skin retaining its natural aspect in the intervals; passes through a regular course of increase, maturation, and decline; and terminates usually in from ten

to fifteen days, but is sometimes prolonged to twenty-one days. It is frequently preceded by constitutional disorder, and is sometimes critical of other diseases. The vesicles are filled at first with a colourless and clear fluid, which gradually becomes milky and opaque, and ultimately concretes into thin scabs; but occasionally a discharge of it takes place, and ulcerations follow. Tingling or pricking pains sometimes attends the eruption. In some cases, as the crusts fall off in one part, fresh vesicles arise in the vicinity, and the eruption thus creeps over a large portion of the surface and its duration is thereby prolonged. — Adopting the division of M. BIETT and Dr. A. T. THOMSON, I shall consider the forms of Herpes as follows: —*Species* 1. *Herpes Phlyctanodes*; — var. *a*. *H. Zoster*; *b*. *H. Circinnatus*; *c*. *H. Labialis*; *d*. *H. Præputialis*. — Species 2. *Herpes Iris*.

4. I. DESCRIPTION. —Spec. i. HERPES PHLYCTENOIDES. — CHARACT. — *An eruption of small transparent round vesicles, in irregular agglomerated patches, preceded and attended by slight constitutional disorder.*

5. This species occasionally appears on the forehead, cheeks, and neck, but more commonly on the extremities; and is often disseminated over different parts of the body. A sensation of itchiness, tingling, or painful smarting, or pungent heat of the part about to be affected, is followed by very minute and almost imperceptible red points, clustered so as to compose an irregular-coloured patch, varying from the size of half a crown to that of the palm. After some hours, or next day, a number of hard, shining, round vesicles, the size of millet-seeds, or a little larger, arise on the inflamed patches, and are filled with a colourless, or pale citron-coloured serum, or with a brownish serum in the aged or cachectic. The vesicles are grouped in irregular clusters, of different sizes, varying from a dozen to fifty vesicles, or more. To the primary cluster or clusters, others succeed; the integuments intervening between the clusters preserving their healthy hue. The tingling and smarting are increased by heat, and by the warmth of bed. The size of the vesicles generally increases, and some acquire that of a pea, or become larger, apparently by the confluence of several into one. In about twenty-four or thirty-six hours, the fluid in the vesicles becomes milky, in the smaller, and brownish, or sanguinolent, in the larger. The whole decline or break from the sixth to the tenth day; but new clusters often continue to arise. The fluid and detached cuticle are rapidly turned into yellowish or blackish scabs, which are loosened or fall off from the tenth to the fifteenth day, or even later. The surface affected retains for some time a red or livid colour, and continues the seat of prickings or smarting. The fluid of the very minute vesicles is occasionally absorbed, and thus some of the clusters miscarry. In rare cases, the clusters have a circular form, and the areas of the groups are covered by distinct vesicles—the *Nirles*. This form is attended by severe pain, and much constitutional derangement.

6. This species of herpes is generally preceded by disorder of the digestive organs, flatulent distension or oppression at stomach; by thirst, heat, and slight febrile disturbance; and by an unhealthy state of the excretions. The constitutional disturbance is not relieved by the eruption, but often aggravated by the heat and tingling of the successive groups of vesicles. This eruption usually assumes an *acute* form, and *terminates* within three weeks, but it sometimes becomes *chronic*, one crop of vesicles succeeding another. It may appear in persons labouring under other diseases, especially of the biliary organs, and of the digestive mucous surface.

7. *A. Herpes Zoster.* — SYN. Ζωστηρ; *Zona*, Scribonius Largus, Sagar; *Herpes Zoster*, Hoffmann, Willan; *Erysipelas Zoster*, Sauvages; *Shingles.* — This variety differs from phlyctenoid herpes in the size of the vesicles, in the seat of the eruption, and in the mode in which the clusters successively appear and extend themselves. The vesicles are closely agglomerated, but distinct; they increase to the size of pearls in twenty-four hours; and are filled with a limpid transparent fluid. The inflamed bases are irregular and large, extending some distance beyond the vesicles. The most frequent seat of this variety is the trunk, particularly the abdomen and lower part of the thorax. As the patches successively appear, they extend either obliquely round the waist, or across the shoulders; or from the shoulder to the arm; or from the nates obliquely down the thighs. They very rarely advance perpendicularly. The right side is more frequently affected than the left; the eruption rarely or ever appearing on both sides at once. Of fifty-three cases, RAYER observed thirty-seven on the right side.

8. Shingles are preceded by febrile rigors, quickened pulse, headach, thirst, and disorder of the digestive organs, and of the excretions. Pains darting across the chest, scalding heat, smarting or stinging pain in the part about to be the seat of eruption, are also often present; but frequently the antecedent and attendant constitutional disturbance is but slight. The eruption consists at first of patches of shining or silvery vesicles. These usually extend, in the form of a zone; but sometimes they appear at the opposite extremities of the zone, and join by successive patches extending towards the centre. The vesicles of the individual groups reach their utmost size, which seldom exceeds that of a pea, in three or four days. The patches are then more florid, and the redness extends a few lines beyond their circumference. At the end of five or six days, the fluid of the vesicles presents an opalescent hue, becomes seropurulent, or even purulent, if the inflammation run high. The redness of the base is now deeper, or more livid, and some of the vesicles subside; others break even before this, and, the cuticle being detached, suppurate for a few days: but the greater number dry up, and form yellowish, or brownish lamellar, or prominent, scabs, which in ten or twelve days fall off, leaving the skin red and tender. In old debilitated, or cachectic persons, the vesicles often enlarge into *bullæ*, soon break, suppurate, or even ulcerate. The greater number of the vesicular groups of zonæ arise in succession; and, while those which have first appeared are becoming purulent, or drying up, others arise in the intervals, and pursue the same course. In from ten to twenty-one days, the whole of the incrustations are detached; but, when the vesicles are very large, or confluent, and the skin much inflamed, ulceration sometimes takes place,

and the disease is much longer protracted. In some cases, the pain described above continues for a time after the eruption has healed. The febrile symptoms often subside when the eruption is completed, but these symptoms are sometimes aggravated during its progress; the deep-seated pain in the part occasionally continuing to the last.

9. *B. Herpes Circinnatus,—Ringworm, Vesicular Ringworm* — is characterised by small, round, and crowded vesicles arranged in the form of rings. It appears on the neck, cheeks, forehead, arms, shoulders, and other places, in red, oval, or circular spots, of half an inch to two inches in diameter; and is attended by itchiness and smarting. The redness is much less in the centre than towards the circumference of the smaller spots, and is entirely wanting in the areas of the larger patches. Small vesicles, whose bases are slightly inflamed, containing a transparent fluid, rapidly appear in the circumference of the patches, the areas becoming temporarily of a slight red colour. From the fourth to the sixth day of the eruption the redness declines; the vesicles become turbid, and either burst or are covered with thin brownish incrustations, which are detached between the tenth and fifteenth day, a slight desquamation at the same time taking place from the centres of the patches, when the redness had extended to them. Patches of small size often have the fluid in their vesicles absorbed, the cuticle exfoliating. The duration of this eruption does not extend above the time just specified; but it may be protracted very much longer, when the eruption of the vesicular rings is successive. In some instances the areas of the patches are covered with minute vesicles; and when this is the case, the patches spread, and extend over a considerable space. M. Rayer and Dr. A. T. Thomson state that this eruption is is seldom accompanied by any constitutional disturbance. This, however, does not agree with my experience. The general disorder is certainly very slight, and thus escapes detection; but, in most cases, the digestive canal is more or less deranged, and the evacutions morbid.

10. *C. Herpes Labialis — herpes of the lips* — is similar to the varieties already described, as respects the characters and progress of the vesicles, the only differences resulting from situation. It may be seated, either in the lower, or in the upper lip, or it may extend around the mouth. It is sometimes confined to the angles. It usually appears outside of the true lips, extending to the line of union between these and the skin. Sometimes patches of the eruption also appear on the cheeks and alæ of the nose. — In three or four days, the vesicles contain a yellowish purulent fluid. The lips swell, and as the disease proceeds, become hard, sore, stiff, hot, and smarting. After the vesicles break, and crusts form, and especially if the latter are prematurely removed, the redness increases, the surface becoming harsh or cracking; and the disease is often protracted. — When it is consequent on disorder of the digestive organs, it often assumes a chronic form.— This variety is generally consequent upon a febrile state of the system and disorder of the prima via. The patient complains of headach, chills, pains in the limbs, lassitude and want of appetite for some time before the eruption appears. The alvine evacuations are usually morbid, and the abdomen often tumid or tender. Sometimes this variety is critical of catarrhal complaints, of agues, and of several acute diseases attended with pyrexia. It is occasionally preceded, or accompanied by vesicles or aphthæ in the mouth.

11. *D. Herpes Præputialis* (*Aphthæ præputii vel vulvæ — Ulcuscula præputii*) — is characterised by one or more groups of small, round vesicles, on the outer or inner surface of the præpuce, or on both, that usually disappear in about a fortnight. It begins in one or several patches of from four to eight lines in diameter, which are circumscribed, and of a vivid red; and rarely appears on the glans penis. The eruption of vesicles is preceded by itching and tingling of the part, which is slightly inflamed and tumid. Small vesicles arise between the second and fourth day, containing a transparent serum, which, about the fourth day becomes turbid, and afterwards puriform. On the exterior, they dry and form scabs, from the fifth to the seventh day, of a lamellar or conoid form; and, if the part be not exposed to irritation or friction the healing process proceeds underneath the scabs which are thrown off from the seventh to the tenth day. When the eruption occurs on the inner surface of the præpuce, the vesicles generally break as early as the fourth day, and the inflamed rete becomes exposed, forming a superficial sore, which has been mistaken for chancre.

12. This variety of herpes not infrequently occurs on the *labia vulvæ* of women affected with leucorrhœa, or during pregnancy and after delivery; and the eruption may be either internal, or within the labia. In these cases, the characters and progress of the vesicles, and of the consecutive sores, are the same as already described.

13. ii. Herpes Iris. — Charact. *Small groups of vesicles surrounded by four concentric erythematous rings of different hues.*

14. This species was first arranged under herpes by Dr. Willan. It was accurately described by Dr. Bateman. It occurs most frequently on the back of the hands, olecranon, knees, ankles, instep, and similar parts. It commences in small red spots, consisting of concentric rings of varying shades. These spots enlarge from two to about eight lines in diameter; and, in their centres, a yellowish-white, flattened vesicle appears from the second to the third day, surrounded by several others of a smaller size, arranged in a ring. This central vesicle is surrounded by a circle of a dull brown colour, this by a second nearly of the colour of the vesicle; this second by a third circle of a deeper red; and the third, by a fourth, formed on the seventh, eighth, or ninth day. This, the most external ring, is of a rosy tint, which passes insensibly into the colour of the healthy skin. The third is the narrowest of these rings; and they may all become covered with vesicles, but the first is most frequently so covered. From the tenth to the twelfth day the fluid of the vesicles is absorbed, or it escapes and dries into scabs, which are detached two or three days afterwards.

15. II. Causes. — The causes of the varieties of herpes are often very obscure; and consist rather of some anterior disorder of the constitution, characterised by deranged digestion and excretion, and by vascular irritation, than of direct agents. The truth is, that they are altogether symptoms of

pre-existing disorder of the system, implicating especially the digestive, the biliary, and excreting functions. They do not depend upon contagion, and they may occur several times in the same person. They are often an advanced symptom, which frequently proves critical, of catarrhal, febrile, or inflammatory affections. — *a. Herpes Zoster* is most commonly observed in persons having delicate and irritable skins, between twelve and thirty years of age; but it is also met with in the aged. It is most prevalent in summer and autumn; and is generally dependent upon derangement of the biliary organs and digestive canal. — *b. Herpes Circinnatus* is common in children, especially in girls of a delicate frame, with thin irritable skins, and often depends upon the same internal disorder as the foregoing. — *c. Herpes Labialis* is often consequent upon catarrhs produced by vicissitudes of temperature; but in its more chronic states it is usually connected with derangement of the organs of digestion. — *d. Herpes Præputialis* is frequent in middle aged men, or in those advanced in life. It sometimes accompanies stricture, or an irritable state of the urethra, or disorder about the neck of the bladder. More frequently it depends upon acrid secretions from the root of the glans. It is independent of the use of mercury; as it is also of affections of the urethra, although often connected with these affections. It is frequently symptomatic of chronic derangement of the liver and digestive tube. It is non-contagious. — *e. Herpes Iris* is most common in children and fair delicate females. It may also be considered as dependent upon internal disorder.—All the varieties of herpes occasionally appear after unwholesome articles of food, and other errors of diet; and after perturbations of the mind, especially when disorder of the digestive functions had previously existed.

16. III. Diagnosis. — Herpes was often confounded, by writers previous to Willan, with erysipelas, impetigo, and eczema. — *a.* It is to be distinguished from *Erysipelas*, by the numerous, small, clustering vesicles; by the healthy surface between the clusters; and by the absence of redness and tumefaction before the vesicles appear; and from *Pompholyx*, by the vesicles arising in groups or patches on an inflamed base. — *b.* Neither *Eczema* nor *Impetigo* assumes the purely vesicular form, nor runs the same course, within a limited time, nor forms the dry harsh scab, which characterises herpes. — *c. Herpes Circinnatus*, when appearing on the forehead, and at the roots of the hair, may be mistaken for *Porrigo scutulata*, but the vesicular form of eruption, the regular course it pursues, and the persistence of the hair, distinguish it from this affection. — *d. Herpes Præputialis* may be confounded with *syphilitic pustules* or *ulcers*. The common chancre commences by a single pustule, whereas the herpetic affection consists of a cluster of vesicles; the thick scabs of the former differing from the thin incrustations of the latter. When herpes is seated on the inner surface of the præpuce, and has passed into the state of excoriation, the diagnosis is more difficult. But the superficial clustering character of the sore is different from the deep ulcer of syphilis, with its hard elevated edges, and the small grey-coloured false membrane covering its bottom.

17. IV. Treatment. — *A.* This is nearly the same in all the varieties; and should be based upon the pathological dependence of the disease insisted upon above (§ 15.) Keeping the connection of the eruption with disorder of the digestive organs closely in view, a mild ipecacuanha emetic should be exhibited, and subsequently any gentle purgative, with magnesia or an alkaline carbonate. Afterwards a free use of diluents and abstinence are all that will be required in most cases. In the more severe attacks, especially of herpes zoster, additional means will often be called for. Where there is much antecedent or attendant fever, M. Rayer advises a moderate bleeding, or the application of a number of leeches to the anus, or around the seat of eruption. Neither of these is often necessary. When the evacuations are morbid, and the biliary functions impaired, a dose of blue pill, or of calomel, at bed-time, and a mild purgative, containing an antacid, the following morning, will generally be of service. It may be even requisite to repeat these; and afterwards, particularly when the urinary and fæcal excretions are disordered, to promote the actions of the liver and kidneys, by small doses of colchicum with magnesia or an alkaline subcarbonate. In the more painful cases of zona, these means will be found most beneficial. During the course of the complaint, the diet should be mild, chiefly farinaceous, and in small quantity. The beverages should be demulcent and cooling.

18. *B.* When herpes assumes a chronic character, owing to the successive eruption of clusters of vesicles, or to the excoriation of the inflamed skin, small doses of blue pill, or of the hydrargyrum cum creta, and mild stomachic aperients, are the most appropriate means. In addition to these, the decoction of sarsa, or of the elm-bark, with liquor potassæ, are often very serviceable. In *herpes labialis*, and *herpes præputialis*, these remedies are especially required. In more obstinate cases, particularly when the excretions continue disordered, mild stomachic purgatives, and alteratives, should be persisted in; and warm or tepid bathing, or even vapour baths, occasionally employed. In *herpes iris*, the warm bath, and minute doses of the arsenical solution with the liquor posassæ, are generally of service. Dr. A. T. Thomson, recommends, for this species, the decoction of the Rumex obtusifolius with these alteratives.

19. *C.* When herpes occurs in cachectic or aged persons, not only should great attention be paid to the state of the excretions, all fæcal and morbid accumulations being duly evacuated; but the digestive and assimilating functions ought to be promoted, by exhibiting gentle tonics, with the alkaline carbonates. If the eruption ulcerate, the application of nitrate of silver, in substance, or in a strong solution, will promote cicatrisation. If there appear a disposition to slough, the preparations of bark, &c. will be required. When violent sub-cutaneous pains accompany zona, hyoscyamus or other narcotics may be given with the medicines already recommended; but the warm or vapour bath, and colchicum, as above prescribed (§ 17.), will be found the most successful. In *herpes præputialis* and *herpes vulvæ*, the early application of nitrate of silver will often shorten the duration of the eruption. Where there are much heat and stinging of the parts, a wash containing the subborate of soda, or the

sulphate of zinc, or of alumina, will often be useful. These may also be prescribed in herpes circinnatus; but in all cases the chief attention must be directed to the removal of disorder in the digestive and biliary organs, and to the regimen of the patient.

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HICCUP.

— Syn. Λὺγξ, λυγυὸς, Hippocrates. *Singultus*, Pliny, Sauvages, Vogel, Sagar. *Lygmus*, Swediaur. *Pneusis singultus*, Young. *Clonus singultus*, Good. *Hoquet*, Fr. *Glucksen*, *Schlucken*, Germ. *Singhiozzo*, Ital. *Hiccough*, *hocket*, *hickup*.

Classif. — 4. *Class*, 3. *Order* (*Good*). II. Class, III. Order (*Author*).

1. Defin. — *An uneasy sensation at the præcordia followed by a rapid contraction of the diaphragm, of momentary duration, causing an audible inspiration, iterated at short intervals.*

2. i. *Description.* Although hiccup is frequently symptomatic of dangerous maladies, and is even a fatal sign in these, yet it is occasionally the chief and primary disorder. When it is thus idiopathic it is generally a slight and, evanescent affection. It consists of a sudden and rapid contraction of the respiratory muscles, of the diaphragm especially, instantly followed by relaxation, thereby causing as rapid an inspiration, which is audible from its suddenness and force. These convulsive movements return at short intervals, and are attended by painful uneasiness at the præcordia and epigastrium, increasing with the frequency of the convulsive contractions and continuance of the disease.

3. ii. *Causes.* — Hiccup occurs frequently in infants and young children. It is not uncommon in aged persons: and, at these epochs, is generally symptomatic of irritation of the stomach or duodenum, or produced by a too precipitate deglutition, the movements which accomplish this process often taking place in an irritable or spastic manner, in persons at the two extremes of existence. The arrest of the alimentary bolus in the œsophagus; an insufficiently masticated or dry state of the bolus; an irregular or precipitate performance of deglutition, especially, when the stomach is empty or debilitated; the ingestion of highly seasoned or stimulating food or drink, or of cold fluids; laughter, particularly in hysterical females; long fasting and emptiness of the stomach; irritating or poisonous substances in this organ; worms in the digestive canal; and wearing strait-laced corsets, are the most common exciting causes of the less important and idiopathic cases of this affection.

4. Hiccup may be one of the forms in which hysteria manifests itself, particularly when hysterical patients have been subjected to mental emotions, as after crying or laughing. It may also follow a fit of cough or vomiting; or it may be produced by sudden frights. But in all these, debility, especially of the digestive organs, is a predisposing cause. It is often a symptom of irritation or inflammation of an adjoining viscus, particularly of the convex surface of the liver, and of the stomach, especially at its cardiac orifice. It may arise from the passage of biliary calculi along the ducts, or from calculi in the kidneys or in their passage into the ureters. Strangulation of internal parts, irritating matters in the colon, external injuries and fractures of the ribs, the various stages of pregnancy, and the suppression of accustomed discharges and eruptions, have severally produced it. Besides, singultus occurs in a great number of acute diseases and fevers, particularly towards the close of life. It usually attends fatal cases of inflammation of the abdominal viscera, and is generally present when hepatitis of the upper or posterior parts of the liver extends to the diaphragmatic peritoneum, or when abscess of this organ points upon the diaphragm.

5. When singultus occurs after a too full meal, or after the ingestion of cold or irritating fluids, which is very common, it is comparatively of little import, further than that it evinces a debilitated state of the stomach and increased irritability. But when it follows a meal either frequently or habitually, chronic inflammation of the stomach, especially about the cardiac orifice, or even of the œsophagus or duodenum, should be suspected; or irritation of the pancreas or biliary ducts, or worms in the alimentary canal may exist. When depending upon this latter cause, it sometimes alternates with sneezing and pruritus of the nostrils.

6. Authors have recorded numerous instances of hiccup continuing from two to three days to many months, or even longer, in some cases without any other very prominent symptom of disease; in others, alternating with sneezing, syncope, or hysteria. Various anomalous cases of this affection have been recorded by Poterius, Schenck,

Bartholin, Alberti, Lanzoni, Hoffmann, Bauer, Parr, and others. Most of these have arisen from some permanent source of irritation, as biliary or urinary calculi; or have been one of the many manifestations of hysteria. The only instances of persistent hiccup that I have observed, were referable to these sources, or to uterine irritation.

7. iii. The *lesions of structure* most frequently observed in those who have experienced this affection in a remarkable manner, have been chiefly the following: — The usual appearances and results of inflammation of the peritoneum pleura, diaphragm, liver, stomach, or other adjoining viscera; encysted or other tumours connected with, or pressing upon, the diaphragm or its crura; scirrhus of the cardiac orifice of the stomach, or of the pancreas; morbid structures developed about the root of the mesentery; calculi, and abscesses in the kidneys, or calculi in the gall ducts; tumours pressing upon the eighth pair of nerves; and albuminous or other fluids effused into the sacs of the pleura, or into the peritoneum.

8. iv. Of the *diagnosis and prognosis* of singultus it is unnecessary to make any specific mention. The former is obvious: the latter may be inferred from what has been already stated. When hiccup is the primary disorder, and quite independent of internal inflammations, or of fever, a favourable result will generally follow, although it may be more than usually severe or frequent in its attacks. But when it is a symptom of these maladies, and appears at a far-advanced stage of acute or chronic diseases, it is generally a fatal indication. Cases, however, will occur in which the experience and pathological discrimination of the practitioner will be severely tried in giving an opinion as to the result.

9. v. *Treatment.* The means of cure in this complaint should be selected with strict reference to the causes and pathological dependency of it. — *A.* In the *primary* or *idiopathic* forms of it, the administration of *opium* with *ether*, or of other *anodynes* and diffusible *stimulants*, and of refreshing alkaline beverages, will generally give relief. Various *antispasmodics*, volatile nervines, and sedatives, especially *camphor*, *ammonia*, *hyoscyamus*, *hydrocyanic acid*, either taken into the stomach, or inhaled into the lungs with warm vapour, will often remove the complaint. Idopathic hiccup also may cease spontaneously; or it may be arrested by exciting some powerful mental emotion, as surprize, fright, &c., or by powerfully exciting the diaphragm by *sternutatories* or *emetics*; or by taking any substance in quantity into the stomach. When its continuance or severity requires medical interference, the pathological knowledge and diagnostic acumen of the physician are often put to the test, as either the absence of other symptoms, or their equivocal nature, renders it doubtful to what cause it should be assigned. In those cases, the chest and abdomen ought to be minutely examined before any opinion is formed.

10. In obscure or doubtful cases, *camphor*, with or without the *nitrate of potash*; the *spiritus ætheris nitrici*, or the *spiritus ætheris sulphurici comp.*, or the *tinctura camphoræ composita* may be given with *demulcents*. The alkaline *sub-carbonates* may also be exhibited with *hyoscyamus*, or with *colchicum*, *opium*; or the *hydrocyanic acid* may be given in an aromatic or gently tonic infusion. If there be reason to refer the affection to irritation in the kidneys, or in the biliary ducts, demulcents with camphor, and the *sub-carbonates of soda, &c.*, will generally be of service. If it appear to depend upon worms, the treatment should be directed accordingly. When it is referrible to inflammatory action in the stomach, or duodenum, full doses of *calomel* with opium and small quantities of camphor, general or local depletions according to circumstances, and cathartic enemata, are chiefly to be depended upon. Even in the more obscure, and non-febrile cases, which may resist soothing and antispasmodic remedies, *cupping* over the hypochondria, or along the vertebral column, as recommended by J. P. Frank, followed by *blisters*, *sinapisms*, *moxas*, the warm *turpentine epithem*, or other counter-irritants, in the same situation, may be prescribed. In cases where vascular depletion seems inadmissible, advantage may be derived from *dry-cupping*, as advised by Riedlin, Cleghorn, and Hufeland. Besides these, the tincture of *nux vomica* has been employed by Ranoë; and the *cajeput oil*, by Vogel.

11. When this affection is merely a form of *hysteria*, or is connected with uterine irritation, *cold aspersions* of the surface; *refrigerants* with camphor, and the other means usually employed in that complaint are indicated. When it assumes a periodic character the *sulphate of quinine*, and other preparations of bark may be prescribed, with sulphuric acid, and sulphuric æther. Repeated doses of *magnesia* with *ammonia* and *aromatics*; the carbonates of *iron*, and other preparations of this metal; the sub-nitrate of *bismuth*; the various preparations of *zinc*; and lastly, *electricity* or galvanism in the direction of the spine or diaphragm, have severally been recommended.

12. When hiccup is a distressing symptom about the fatal termination of disease, large doses of camphor, of ammonia, or of musk, and opiate frictions, &c., have generally been prescribed; but these can only palliate, and very frequently they are inadequate to accomplish this intention.

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HOOPING-COUGH. — Synon. *Pertussis*, Sydenham, Huxham, Cullen, Darwin. *Tussis Ferina*, Hoffmann. *Tussis Convulsiva*, Sauvages. *Tussis Quinta*, Schenck. *Tussis Clangosa*, Bourdelin. *Tussis Delassans*, *T. suffocans*, *T. Amphimerina*, *T. Tussiculosa*, *T. Stomachalis*, *T. Spasmodica*, Auct. var. *Pneusis Pertussis*, Young. *Bex convulsiva*, Good. *Bronchitis Epidemica*, Marcus. *Bronchitis Convulsiva*, Prunel. *Bronchocephalitis*, Desruelles. *Coqueluche*, *Maladie Cuculaire*, *Toux Quinteuse*, Fr. *Keichhusten*, *Kikhusten*, *Krampfhusten*, Germ. *Kikhosta*, Swed. *Pertosse*, Ital. *Whooping-cough*, *Chin-cough*, *Kin-cough*, *Kinkhost*.

CLASSIF. — 2. *Class.* 3. *Order* (Cullen). 2. *Class* 2. Order (*Good*). II. CLASS, III. ORDER (*Author*, in *Preface*).

1. DEFIN. — *Convulsive and suffocative cough, accompanied with a reiterated hoop, or consisting of many successive short expirations followed by one deep and loud inspiration, and these, alternating for several times; occurring in paroxysms, ending with the expectoration of tough phlegm, and frequently with vomiting; infectious and often epidemic; appearing but once during life.*

2. M. GUERSENT defines hooping-cough to be a catarrhal affection of the air-passages, characterised by sonorous inspirations with imminent suffocation. The origin of this disease is obscure; for, if the ancients have at all observed it, they have not described it so as to enable us to recognise it. Doubtless new maladies may develop themselves in the progress of the refinements of society, and of the changes which the physical and moral world have undergone during a lapse of ages. This cannot be denied in respect of some of the exanthemata, or of diseases propagated by a specific virus, as smallpox. But, excepting these, it is difficult to admit, that those maladies the spread of which very much depends upon atmospheric vicissitudes, and epidemic constitutions, and upon general susceptibility of the species, can have been of modern occurrence entirely. It is not easy to conceive why a disease should not have at least occasionally appeared; since the circumstances favouring, and causes inducing, it must have been in existence from the earliest ages. It may be said of hooping-cough, as of some other diseases, that, although the more exact observations and descriptions of modern observers have made it known only in comparatively recent periods, yet it may have existed nevertheless, and have been unknown from having been confounded with other maladies resembling it.

3. The passages in HIPPOCRATES that may be referred to this disease, are equally applicable to several other catarrhal affections, or disorders of the respiratory organs. Some of the older writers take notice of epidemics, which have been considered to have been hooping-cough, especially those of 1239 and 1311. But they may have been severe catarrhal epidemics, or influenza. ROSEN thinks, that pertussis passed from the East Indies and Africa into Europe; but of this he has furnished no satisfactory proof. According to MEZERAY, it first appeared in France in 1414; and he has been generally considered as having given the earliest account or description of the disease. But, upon referring to this writer (*Abrégé Chron. ou Extrait de l'Hist. de France*, t. iv. p. 65.) there is nothing but the name *Coqueluche* that is applicable to it. Indeed his account would have been quite applicable to the influenza of January, 1837. The epidemics noticed by DE THOU, and PASQUIER, to which the same name was given, and which occurred in 1510, and 1557, were evidently influenza, and not hooping-cough; and the same remark is applicable to most of the supposed epidemics of this latter disease, during the sixteenth and seventeenth centuries.

4. WILLIS was the first who accurately described hooping-cough under the name of "Tussis puerorum convulsiva, seu suffocativa, et nostro idiomate *chincough* vulgo dicta." (*Opera omnia*, Amst. 1682. vol. ii. p. 169.), and it is only from his time that we have any account of the disease that can be relied upon. It was afterwards noticed by SYDENHAM, (*Op. Universa.* Lugd. Bat. 1726. p. 311.), and by both it was treated of as a common disease. It is extremely doubtful that the epidemics of the 15th and 16th centuries, which proved so very fatal were actually this complaint. The imperfect notices made of them convey nothing really proving that they were it. ROSEN confesses, that he cannot determine when pertussis first appeared in Sweden; and, as respects this country, there is no account earlier than that of WILLIS which can be received.

5. I. DESCRIPTION. — Hooping-cough, whether in an epidemic or sporadic form, presents nearly the same phenomena, particularly when it is simple or uncomplicated. But it is modified in many respects by the season, climate, constitution or habit of body of the patient, and by the complications which take place in its early stages. I shall, therefore, describe, first, its simple or uncomplicated form, and, secondly, the complications which it frequently presents.

6. i. SIMPLE HOOPING-COUGH. — Pertussis has been divided into two stages by some writers, viz., the *catarrhal* and the *convulsive;* and into three by others, the second stage being divided by the latter into the periods of convulsion, and of decline. *A.* The *stage of development*, or the catarrhal period, is generally announced by some slight rigors or chills, turgescence of the face, slight redness of the conjunctiva, watering of the eyes, and the signs of simple coryza. There is scarcely any fever, sometimes only, for twenty-four or thirty-six hours; but, in some cases, the fever is more marked, and it occasionally assumes a quotidian or tertian type. The cough is more or less frequent, comes on in fits, and may at this time be taken for common catarrh, or catarrhal affection of the trachea and bronchi. However, a slight shade of difference may be detected in the tone of the voice, which experienced observers will recognise as characteristic of the disease. The cough is more sonorous, and more acute than in bronchitis; expectoration is scanty, even with adults, and the matter brought up is limpid, as at the commencement of catarrhal affections. The anterior part of the neck is sometimes uneasy, or even painful, but in other respects there is little complaint, excepting a slight depression of spirits, moroseness, heaviness, diminished appetite, and sluggish bowels. This period generally continues from five to twelve days, and seldom more than fifteen.

7. *B. In the Convulsive, Spasmodic, or Nervous Stage*, the patients complain frequently of uneasiness or pain under the sternum; the fits of cough are longer, more frequent, particularly at night, and commence with unpleasant titilation at the larynx, during which the expiratory and inspiratory movements are irregular and incomplete, chiefly in very young children, who evince considerable dread of the attack. This state is attended with anxiety and a slight mucous rattle. On the accession of the fit, infants grasp persons or objects that are near them, or upon awakening from sleep start up. Each accession consists of a very dry, sonorous, spasmodic cough; the contractions of the respiratory muscles, being so quick, and succeeding each other so rapidly,

and attended with so much constriction of the larynx, that the patient cannot breathe and seems almost suffocated. The face and neck are swollen, injected, and violet-coloured; the jugular veins are gorged; the eyes prominent, injected, and watering; and the paroxysm terminates with one or two long incomplete inspirations, attended with that peculiar noise from which the disease has generally derived its designation. Sometimes the fit of cough is interrupted during one or several minutes, and is resumed; but does not cease entirely until the patient rejects, by a sort of regurgitation, a ropy and limpid fluid, which comes partly from the bronchi, and partly from the stomach, as shown by the presence of portions of ingesta, and of bronchial mucus. In some cases, when vomiting does not accompany the paroxysm, this particular fluid proceeds chiefly from the air-passages; in others, particularly in those accompanied with vomiting, it is chiefly from the stomach. It is sometimes sanguineous, either in streaks or specks; and when the paroxyms are severe, blood sometimes escapes from the nostrils, and even, in rare cases, from the ears and eyelids. The termination of the paroxysms is often attended by a watery secretion from the eyes. Crying, mental irritation, or opposition, frequently bring on a fit; and even the sight of another in the paroxysm, will induce it in those affected by the disease. The fits are generally much more severe after a meal, or after running, or other very active exercise. Their number varies with the severity of the disease, from five or six in the twenty-four hours, to one every ten or fifteen minutes; they are generally severer, and more frequent during the night than in the day. On applying the stethoscope or the ear to the chest, on the accession of the paroxysms, a mucous rattle may sometimes be heard; but frequently no unnatural noise can be detected, unless the disease is complicated with bronchitis. During the paroxysm the respiration is so far suspended as not to be heard in any part of the lungs; but at the moment of inspiration, the air is precipitated by a loud hissing sound, as far as the bifurcation of the bronchi, where it seems to encounter some obstacle, as it does not pass further for one or two seconds. This stage usually continues from fifteen days to a month, or even longer. During its course, the fever, which had been either scarcely perceptible or but slight, but had been suspended after the invasion of the disease, is, in some cases, rekindled with more force, assuming the continued or intermitting type. It is chiefly during the early part of this stage that pertussis becomes complicated with, or excites, bronchitis or other disease of the lungs. Yet such complications occur at various intervals from the attack, and sometimes even accompany the first stage. But it is generally during this period that affections of the head, or of the abdominal viscera, supervene, which, with lesions of the lungs, occasion unfavourable terminations. However, when the disease is slight and uncomplicated, it is without fever, the patients preserving their usual health and appetite, which may be even more craving than usual.

8. C. The *Stage of Decline* is of indeterminate duration, occurring from three to five weeks after the invasion of the disease, and continuing from twelve days to two or three months. It may be said to commence from the time of the paroxysms being more distant and shorter than in the preceding period, and by their termination, in the excretion of an opaque and thickish matter, as in the last stages of catarrh, and in the vomiting of alimentary matters. The fits become insensibly feebler during this stage; the cough gradually loses the characteristic whoop, and approximates nearer that attending the last stages of catarrhal affections. Sometimes the patient will remain for a day or two, or even longer, without cough; but on exposure to cold, change of temperature or weather, or after errors of diet, it returns with similar characters. In some seasons especially, as during autumn, and at other seasons on the occurrence of easterly winds, I have seen the paroxysms of cough return, with the same characters after a fortnight, a month, or even two or three months, of perfect and apparent recovery.

9.ii. COMPLICATED PERTUSSIS.—Hooping-cough is frequently accompanied with, or occasions, in its severer forms, or in predisposed subjects, most serious affections. It may even attack patients already suffering or convalescent from disease; and although occurring under such unfavourable circumstances, may not be severe and may terminate favourably, although in other cases it will often aggravate the pre-existing or accompanying malady — so much so as even to lead to a fatal termination. The complications of hooping-cough vary extremely, according to the season of the year, the state of the weather and atmospherical vicissitudes, the character of the prevailing epidemic, and the habit and temperament of the patient. They constitute the most important features of the disease, inasmuch as the danger depends entirely upon the particular form of complication present. The success, also, of the practitioner will mainly depend on the celerity and accuracy with which he may detect existing or incipient states of superadded or contingent disease, and the decision with which he may treat them. The importance of attending closely to the progress of whooping-cough, even in apparently favourable cases, must be apparent to those who have had occasion to observe how insidiously diseases of the substance of the lungs, or of the brain, have supervened and advanced even to an irremediable degree, masked by the cough, so as to have failed of attracting the attention of parents or those around the patient — or, if they have attracted notice, to have been mistaken for a symptom merely of the simple and less dangerous affection. I have frequently been called to children dangerously affected with disease of the lungs or brain, which had been in existence for many days before attention had been excited by it. Considering the complications of pertussis most important, I shall treat of them somewhat in detail.

10. Pertussis, in either an epidemic or sporadic form, particularly the former, sometimes follows rapidly upon measles. Occasionally it appears during convalescence from that complaint. In such cases disease of the lungs, particularly bronchitis, pneumonia, pleurisy, tubercles, &c., often steals on without being suspected until it has made a formidable progress, or passed beyond the reach of aid. The previous disease, and the treatment employed for it, has often induced that state of the system which does not evince the complication by many of the usual symptoms which characterise it, in the idiopathic or primary form; and it is chiefly by attentive observation of

the pulse and respiration, in the intervals between the paroxysms, and of the expectorated matter, and by examining the state of the lungs by means of percussion and the stethoscope, that we can detect the complication or judge of its nature and extent. In infants with a narrow, or malformed chest, there are often great dyspnœa, frequency of pulse and of respiration, sometimes even without much serious disease of the lungs, beyond slight bronchial irritation. The most common complications of hooping-cough, especially from two or three months old to seven or eight years or later, are *croup, bronchitis, pneumonia, pleurisy, pneumothorax, œdema of the lungs, hydro-thorax.* In all these the respiration is difficult, frequent, and embarrassed; the countenance and extremities are turgid; and there is continued frequency of pulse. The expectoration terminating the paroxysms, varies according as either of the above lesions is present. It is generally much diminished, and, in proportion to the severity of the organic disease and of the accompanying fever. But the extent and nature of the complication should be carefully determined by the stethoscope and by percussion. In somewhat older children, and in those advancing nearer to puberty, who are of a scrofulous habit, and hereditarily disposed to phthisis, hæmoptysis, sometimes to a considerable extent, takes place, and in these subjects particularly, tubercular disease of the lungs is not infrequently developed, either with or without hæmoptoe.

11. *B.* In infants and young children, the *functions of the brain,* and the symptoms, indicating disturbance of this organ, should be carefully watched for, particularly those indicating *cerebral congestion, hydrocephalus, meningitis,* or *cerebritis*; and if any of these symptoms occur, and especially if attended by continued fever, by screaming, or by rolling of the head, or convulsions indicating meningitis, or hydrocephalus; or by somnolency, falling of the eyelids, cool state of skin, inability or disinclination to move or be moved, with dilated pupil, &c. indicating cerebritis, decisive treatment should be adopted, as recommended for these maladies.

12. *C. Diseases of the Abdominal Viscera* are much more rarely complicated with hooping-cough than those already mentioned; however *diarrhœa,* chronic *irritation of the stomach and bowels, remittent fever, inflammation of the mucous surface* of these organs, are not infrequent attendants upon it. Sometimes, even, *inflammation of the peritoneum* and *mesentery* will occur, during the advanced stages of hooping-cough, and I have occasionally also met with inflammation of the cæcum and colon, and *pericarditis.* These complications, particularly those of the digestive mucous surface, may superinduce others, as enlargement of the mesenteric glands, and affections of the cerebral organs, rapidly terminating in effusion.

13. With respect to all these complications, it may be generally remarked, that they are attended by more or less fever of a continued or remittent type, and with paroxysms of cough, more or less dry and severe. Sometimes the febrile exacerbations and remissions are well marked, especially when the complication is in the abdominal cavity. The expectoration terminating the fits generally diminishes as the complication increases in severity, and the vomitings often disappear. The paroxysms also are followed by more sensible prostration of strength. — Having thus taken a general view of complicated pertussis, I shall next more particularly notice those complications which most commonly occur, and which frequently superinduce further disease especially in connected or associated structures.

14. *D. Pertussis associated with Bronchitis* is extremely frequent during spring and winter, and in this climate, especially in the months of February, March, and April, owing to the prevalence of easterly winds at that season. 1. It may precede hoopingcough; 2. It may be coeval with it; and, 3. It may supervene in the course of the disease. The last is most common. Whenever bronchitis appears, there are always decidedly febrile symptoms during the intervals between the paroxysms of cough. The breathing is also much accelerated, and when examined by auscultation is accompanied by the mucous rattle, and occasional temporary suspension of the respiratory sound in parts of the lungs, owing to the accumulation of the mucous secretion for a while in one or more of the bronchial tubes conveying air to those parts of the organ. The expectoration also from being clear, whitish, and ropy, becomes more opaque, less fluid, gelatinous, and less abundant. The paroxysms of cough are much more frequent, and often accompanied with a feeling of oppression in the chest, and are less constantly followed, or even not at all, by rejection of the contents of the stomach. The chest sounds well upon percussion, and the patient lies on the side most affected, or in slighter cases on either side. When the bronchi of both lungs are generally affected, he is unable to lie on either side, or is incapable of lying down at all.

15. This complication often terminates fatally, either from obstruction of the air-tubes by the accumulation of tenacious mucus, together with spasm about the larynx, occasioned by the nervous character of the disease, and the irritation of the glutinous secretion, the patient dying asphyxied; or from congestion of the vessels of the head, owing to the paroxysms of cough, the obstruction produced by the mucus in the air-passages, and the difficult circulation through the lungs; or from the inflammatory action having extended to the trachea and larynx, or to the minute bronchi and substance of the lungs, terminating in condensation. &c. of the structure of the organ, &c. In some cases, owing to the treatment employed and constitution of the patient, the acute form of the bronchial affection gradually subsides until it arrives at a milder state; when, owing to the incapability of the vessels to assume the healthy state, a chronic form of disease continues long afterwards, which may be removed, in some cases, by judicious management; but which terminates in ulceration of the mucous membrane, or gives rise to tubercles, to chronic pleuritis, or other lesions in the thoracic cavity. This complication is frequent from six or seven months upwards, and especially during the second, third, and fourth years of age.

16. *E. Hooping-cough associated with pneumonia and pleuritis,* is very frequent in the spring during easterly or northerly winds, particularly when these follow heavy falls of rain and open weather. It is more common in some epidemics than in others, and is met with at all ages, but most frequently from one to six or seven years or upwards;

and in children of a full habit of body, sanguine temperament, and strumous diathesis, it may be nearly coeval with the pertussis; but it more commonly supervenes in the course of the disease, the inflammation commencing often as bronchitis and extending in parts along the smaller ramifications of the bronchi, to the air-cells and substance of the lungs. In some cases, *pleuritis* supervenes to the pneumonia, and in others a portion or a whole lobe of the organ, and the pleura covering it, seem as simultaneously affected. It is very difficult to ascertain the existence of this complication in infants and very young children, but auscultation and percussion furnish considerable aid to the diagnosis.

17. The *Symptoms* of this complication vary according as the inflammation of the lungs and hoopingcough are coeval affections, or as the one may supervene to the other. When the affection of the lungs or pleura is present from the commencement, the cough occurs frequently, in short paroxysms, and is seldom followed by the rejection of the contents of the stomach. The pulse and respiration are quick, hard, full, and hurried; the alæ nasi and diaphragm labour much during the respiratory motions, and the cough is without the attendant hoop, and does not terminate in vomiting, as the complication becomes developed. When it has been consequent upon the bronchial complication, wheezing, and difficult expectoration are generally present; and the sputa become thick, opaque, glutinous, puriform, or streaked with blood. The prostration of strength is also great. There is a dull sound given out upon percussion of the thorax, over the seat of the disease. On examining the chest with the stethoscope, the signs enumerated in the pneumonia of children are more or less manifest (see art. LUNGS—*Inflammation of*).—When the *pleura* is implicated the cough is more suppressed, and pain is complained of in some part or other of the thorax; yet this latter symptom is not always prominent. In addition to the other stethoscopic signs, the metallic trickling is often present. In the worst cases of this complication, as in those of the preceding, the lips assume a livid hue, and the extremities become cold, or even of a leaden colour. This complication often terminates unfavourably in a short time. During its continuance, the hooping-cough presents characters much less distinct, but which become more pronounced as the inflammation is subdued.

18. *F. Complications with tubercular Phythisis, hydro-thorax*, or *pneumo-thorax*, are rarely or never met with, unless as the consequences of one or other of the foregoing, or in the far-advanced stages of pertussis; and are, therefore, unfavourable terminations, rather than complications, of the disease, arising out of neglect or inappropriate treatment, or constitutional predisposition. The state of the expectoration and hectic symptoms, and the signs furnished by auscultation and percussion, will enable the practitioner to detect either of these terminations.

19. *G. Pertussis associated with inflammatory irritation of the Membranes or Substance of the brain, or occasioning Hydrocephalus*, is very common, particularly in infants, about the period of dentition, or from six months to two or three years of age. In these, convulsions in various forms, spasm of the glottis, screaming, &c., are of frequent occurrence, and indicative of this complication, which is often more prevalent in some epidemics than in others. Congestion of the brain, owing to interruptions to the return of blood from it, during the paroxysms of this disease, often terminates in effusion, capillary reaction, or even softening of parts of the organ. The spasms and convulsions which generally attend these affections of the brain in infants and young children, rarely carry off the patient. They are rather the indications of that state of disease of the substance or membranes of the brain, which terminates in softening of the central parts, and in serous effusion into the ventricles. Whenever the paroxysm of cough is increased in violence, the characteristic hoop disappearing, the face becoming very livid, and the thumbs drawn into the palms, cerebral congestion, with its attendants and consequences, should be anticipated. In some cases, but by nó means frequently, the swelling on the tops of the fingers and toes, noticed by Dr. KELLIE, and the crowing inspirations indicating spasm of the larynx (see LARYNX) and threatening suffocation, are observed, generally at early stages of this complication. When the convulsions affect one side of the body more than the other, and especially if one side or limb be paralysed, softening of some of the more central parts of the brain and serous effusion may be inferred.

20. In all cases of pertussis, when chills, followed by burning heat of the surface; pains of the head, with obscure redness of the conjunctiva; a fixed, brilliant, dry, and peculiar appearance of the eye; unusual redness or pallor of the face; very torpid bowels with morbid excretions; irritability of stomach independently of the fits of cough; aversion from light or noise; heaviness or drowsiness and languor; grinding of the teeth; or sudden starting or shocks of the body in sleep; rolling or tossing back the head, and piercing screams; are observed, then irritation of the brain or its membranes, which will soon pass into organic change and effusion, is manifestly present, whether there be convulsions or not. When stupor or unconsciousness has come on, with one arm waving in the air, or tossed over the head, whilst the other is paralysed, a farther advanced state of disease than mere inflammatory irritation, as softening or effusion, may be inferred.

21. *H. Pertussis associated with Disorder of the Bowels, or with infantile remittent Fever*, is not infrequently observed. In these cases the abdomen is tumid, the evacuations offensive and unnatural, the breath is fœtid, the tongue loaded, and the appetite is impaired. The complexion is lost, and the eyes more sunk and heavy than in health. At last febrile exacerbations and remissions are observed generally twice in the twenty-four hours; pickings of the nostrils and lips; the cough returns more frequently and ceases to terminate in vomiting; the breathing is oppressed, hurried, and short; the expectoration, at the termination of the fits, is more scanty, but without the signs of bronchitis or of pneumonia; and emaciation proceeds. If this state of disorder continue, effusion in the ventricles of the brain may take place, or the mesenteric glands may become diseased. This complication steals on imperceptibly, and generally in the second or third stage of pertussis.

22. iii. *The Appearances observed in fatal Cases of Pertussis* show the nature and extent of the complications, rather than of the disease itself. The accounts furnished us of the fatal epidemics in former ages, contain no details of the appearances after death; and even the more recent researches of Watt, Marcus, Waterton, Guibert, Desruelles, Guersent, and others have thrown little light upon the nature of the malady, although they have illustrated the changes which often supervene in its course. The lesions which are most constantly observed, are more or less redness of the mucous surface of the trachea and bronchi, with considerable tumefaction of the glands at the bifurcation of the latter. These tubes contain a considerable quantity of a ropy or more or less thick mucus. In the bronchitic complication these changes are still more marked, and in infants the thymus gland is often unusually large. Inflammations of the lungs, or of the pleura, or of both, in all their phases and stages; and effusions into the pleural cavities, with or without adhesions or false membranes, are not unusual, but are observed only in cases of the pulmonary complications described above. They are generally associated with muco-puriform matter accumulated in the bronchi, and splenification or condensation of several lobules or portions of the lungs.

23. When the disease induces chronic bronchitis or tubercular consumption, whether hæmoptœ has occurred or not, the mucous membrane of the bronchi has been found thickened, softened, rarely ulcerated in some points and injected, and tubercles have been observed in all stages of development and softening, and accompanied with ulcerated excavations. Tubercular changes are, however, not very common in young children. Dilatation of the bronchi is sometimes observed; but I have not met with it so often as Laennec believes it to occur. It is to be looked upon as a remote consequence of the disease in prolonged cases. M. Breschet observed, in two instances, injection of the pneumo-gastric nerves: but Marcus, Guersent, and myself have not found these nerves materially changed.

24. The morbid appearances found within the cranium have been chiefly consequent upon the cerebral complications, and have consisted of softening of the central parts of the cerebrum; effusion into the ventricles, or between and beneath the membranes; congestion of the vessels, &c. As far as my dissections have gone, inflammatory appearances have been observed in the medulla oblongata, or in its membranes, even when no other remarkable lesion was present within the cranium. Whether this change be a consequence of the disease or not, is difficult to determine; but there can be little doubt that those found in the brain are merely remotely consecutive lesions.

25. The stomach usually presents no particular lesion; but I have observed inflammatory appearances in the œsophagus, and the same have been remarked by Ozanam in his numerous dissections in the Foundling Hospital at Milan. I have likewise found the mucous surface of the pharynx and epiglottis, particularly the latter, more or less inflamed, and the subjacent cellular tissue, especially at the base of the epiglottis, infiltrated and œdematous. The mucous membrane of the intestines, particularly of the cæcum and colon, has been in some instances ulcerated, and the mesenteric glands engorged; but only in protracted cases passing into infantile remittent fever. From the numerous post mortem examinations I have made, I am warranted in stating that most of the lesions observed by writers in this disease are merely effects of the complications of, and diseases excited by, this complaint; and that the parts most constantly found altered, are the mucous covering of the epiglottis, trachea, and bronchi; and of the pharynx and œsophagus; and, as respects the nervous system, the medulla oblongata and its membranes.

26. iv. *Of the Nature and Seat of Pertussis.*— Sydenham imputed hooping-cough to the presence of a subtile and irritating vapour in the blood, affecting the lungs and exciting the paroxysms. Boehme (*Cur-Methode der Wichtigsten, Brust krankeiten*, Leip. 1788), conceived that it proceeded from a peculiar miasma acting chiefly on the nerves. Linnæus had previously referred it to the presence of minute insects in the air (*Dissert. Exanthemata Viva.* Upsal, 1757); an opinion which was partially adopted by Rosenstein, who, however, believed that it was propagated by a morbific principle emanating from the affected, and passing into the system of those exposed to its influence by the respiratory organs and stomach; and hence the affection of those viscera, and the irritation of the mucous glands, occasioning an inordinate secretion of *phlegm.*

27. Waldschmidt (*Institut. Medicinæ Rationalis*, 12mo. Marb. 1688), Stoll (*Ratio Medendi*, pars ii. p. 180.) Danz (*Versuch einer Allgemeinen Geschichte des Keichhustens, &c.* Marb. 1791), Lentin (*Memorabilia*, p. 38), Friborg and Brouzet (*Sur l'Education des Enfans*, t. ii. p. 25), ascribed the disease chiefly to gastric disorder and saburra, whilst they admitted, particularly Danz and Lentin, that the lungs are also much affected, but in a sympathetic manner, and that the other symptomatic disorders accompanying it vary exceedingly, whilst the respiratory functions are more constantly disturbed. Chambon (*Des Maladies des Enfans*, t. ii. 8vo. Paris, 1799), and Tourtelle (*Elémens de Méd. Théorique et Pratique*, t. ii.), considered pertussis as a species of catarrh. The former located it in the stomach, and supposed that it is of an asthenic nature, the cough and other nervous symptoms being occasioned by the affection of this organ. The latter extended the gastric disorder to the lungs, and regarded the disease as a pituitous pneumo-gastric affection. A similar opinion was entertained also by Dr. Styx (Hufeland, *Journ. d. Pr. Arzneyk.* b. vii. st. iv. p. 177). Gardien (*Traité des Mal. des Enfans*, p. 391.) nearly coincided with Tourtelle in referring it to a nervous irritation, *sui generis*, causing a pituitous or increased mucous secretion from the bronchi and stomach with convulsive action of the glottis and diaphragm, and believed that it differs from catarrh chiefly in its cause and the periodicity of its character. The opinion of Millot was not materially different from the foregoing. He referred the disease to a spasmodic irritation of the stomach primarily, and of the lungs symptomatically, and he imputed the cough chiefly to the convulsive action of the diaphragm; but he contended that the throat and bronchi are also implicated. M. Broussais has also argued that the source of the disease is in the stomach; but he considers that it

consists of inflammatory irritation, producing an increased secretion of mucus, and that the termination of the fits in vomiting disembarrasses the affected surfaces and assuages for a time the irritation. He, however, admits that this affection of the stomach is not of itself sufficient to constitute the disease, but that it is always extended to the bronchi. (*Ann. de la Méd. Physiol. Mai*, 1824.)

28. Besides those who have thus considered pertussis either catarrhal in its nature, or allied to this state, others have conceived that it is chiefly of a nervous character. Whilst the former have placed the most stress upon the catarrhal symptoms, particularly the discharge of a clear ropy mucus, and the acceleration of the pulse in many cases,—the latter have been more engaged with the convulsive features of the disease, especially the cough, its occurrence in fits, as in other nervous affections; and with the perfect, or nearly perfect, state of the functions during the intervals in the simple form of the disease.—The opinions of Hoffmann (*Opera.* Suppl. ii. pars x. p. 244.) and of Hufeland (*Bemerk. ueber Blattern, &c.* p. 421.), in this very nearly coincide. They both impute hooping-cough to irritation of the nerves supplying the larynx, air-passages, diaphragm and stomach; to an affection chiefly of the pneumo-gastic nerves. Hufeland supposes that the irritation of the nerves supplying the larynx and air-passages is extended to the diaphragm by the intimate sympathy existing between these parts; that this muscle is thereby thrown into convulsive action; and that, owing to its action on the cardia, and the irritation extending to the stomach through the medium of the eighth pair of nerves, this organ undergoes energetic contraction, and evacuates its contents; the vomiting thus occasioned removing the irritation of the respiratory organs, and thereby terminating the paroxysm. Thus, the vomiting is the antagonist of the spasmodic state of the organs of respiration; and, as observed in practice, a salutary occurrence. Very nearly allied to this opinion is that proposed by Jahn (*Ueber den Keichhusten.* Rudolstadt, 1808.) He considers hooping-cough to be an affection of the phrenic nerves, occasioned by a peculiar miasm too subtle to be recognised. Lobenstein-Löbel (*Ueber die Ang. Membr. den Keichhusten, &c.* 1811.), contends, that this disease originates in a peculiar affection of the nerves of the diaphragm; that, in its second stage, the phrenic nerves are in a state of irritation; and that, in its third, the irritation is expanded throughout the system; it thus commencing with a morbid affection of the diaphragm, which extends itself by nervous connection to the rest of the respiratory apparatus and stomach, and sympathetically to the whole economy.

28.* According to Paldame (*Der Stikhausten.* Halle, 1805.), hooping disease depends on exalted irritability of the lungs, and of the organs most closely sympathising with them, particularly the diaphragm and stomach. Nearly allied with the foregoing opinions, is that which has been proposed by Wendt (*Die Kinderkrankh. System. &c.* 8vo. Breslaw, 1822.). He arranges hooping-cough with nervous diseases; argues against the production of a secretion peculiar to it, yet imputes it to a certain miasm engendered by the nature of the season and constitution of the atmosphere, and thus prevailing generally in an epidemic form. The nerves which he considers chiefly affected, are the branches of the intercostals, the eighth pair, and the recurrent nerve; the solar plexus he views as being consecutively affected. He contends, that the disease is not a variety of bronchitis, as believed by many; and that the bronchi are only sympathetically irritated, and chiefly from the increased secretion of mucus and aqueous fluid poured into them during the paroxysm. He admits that it is generally accompanied with a phlogistic diathesis of the bronchi and substance of the lungs, but that there is no developed state of inflammation; this diathesis admitting, however, of inflammation being speedily kindled up from exposure to its exciting causes, and during certain epidemics; but when it exists, that it is merely a contingent complication.

29. M. Guibert (*Recherches Nouv. sur le Croup et sur la Coqueluche.* Paris, 1824.) views pertussis as essentially nervous. He considers that a common cough may pass into this affection, by having the spasmodic state of the muscles of the larynx and of the diaphragm superadded to it; and, therefore, that spasm superadded to cough constitutes the disease,—the state of spasm resulting from the high nervous susceptibility and particular disposition to it existing in children, and from individual idiosyncrasy. He supposes that, whilst the spasmodic state constituting the disease affects the muscles of the larynx and the diaphragm, in some cases this state is extended to the muscles of the head and whole body, occasioning general convulsions. The increased secretion of mucus he refers to an excited state of the mucous membrane of the air-passages, and of the pharynx, œsophagus, and stomach, existing independently of any inflammatory action; and considers that the paroxysms of cough proceed from obstruction of the bronchi by the accumulation of this secretion; the nervous symptoms being the result of the spasm, which he considers the chief agent of the morbid phenomena. But this theory leaves unexplained the precise cause and origin of the spasm, which, doubtless, affects the parts to which he refers it.

30. According to M. Guersent (*Dict. de Méd.* t. vi. p. 6.), hooping-cough is a catarrhal affection seated in the trachea and bronchi, consisting of a specific inflammation, accompanied with spasm of the trachea and glottis. To this opinion it may be objected, that the causes of the disease are not always of a specific character; that, although it evidently is often propagated by infection, yet it frequently occurs sporadically, and then it cannot be traced to any specific cause. When, also, inflammatory appearances are observed in the air-passages of some cases, which have terminated fatally, these differ not materially from the changes occasioned by common inflammation.

31. Dr. Watt (*Treatise on the History, Nature, and Treatment of Chincough.* Glasg. 1812.) considers the disease to be inflammatory, and seated in the bronchi. Dr. Badham, and Marcus, of Bamberg, entertain the same view as Dr. Watt. Albers, of Bremen, denies hooping-cough to be essentially inflammatory. He justly states, that it is never so rapidly developed as bronchitis; that it is an affection of the nerves of the chest,

frequently occurring epidemically, and generally admitting of cure without the assistance of art, unless when appearing in a complicated state, or when inflammatory action supervenes in its progress, — a termination which would but seldom occur if it were essentially inflammatory, and which seldom is observed to follow bronchitis or pneumonia when left entirely to nature. Thus, whilst Albers considers hooping-cough to be an affection of the nerves of the thorax, with which bronchitis is frequently complicated, Watt and Marcus conceive that it is a catarrhal bronchitis from its commencement. Nearly similar to the opinion of these two authors, seems to be that of M. Fourcade-Prunet, who views it as a variety of bronchitis, without, however, stating in what the difference consists. The convulsive paroxysms of cough he attributes to the morbid sensibility of the mucous membrane of the air-passages in their inflamed state, and to the irritation occasioned by the respired air and the secretion formed on this membrane. M. Boisseau (*Dict. abrégé des Scien. Médicales*, t. v.) entertains a similar opinion to that of M. Fourcade-Prunet; and Dr. Dewees (*A Treatise on the Physical and Medical Management of Children*, 8vo. Phil. 1825.) contends that it is a catarrhal inflammation of the respiratory mucous membrane, with an augmented secretion of mucus. Dr. Dawson (*Nosol. Pract. of Physic.* 8vo. Lond. 1824.) also believes in the inflammatory nature of the disease; but confines its primary seat to the mucous membrane of the glottis. Laennec regards it as a variety of pulmonary catarrh, holding an intermediate grade between the pituitous and the mucous catarrh; and he denominates it, from the convulsive character of the cough, convulsive catarrh. The expectoration he considers to be at the commencement pituitous, and towards its close nearly mucous. The absence of respiratory sounds during the paroxysms, he explains, by supposing either a momentary congestion from blood or serum, giving rise to a tumefaction of the mucous membrane sufficient to obstruct the bronchi, or to a spasmodic constriction of these tubes.

32. Dr. Webster (*Med. and Phys. Journ.* Dec. 1822.) contends, that the symptoms, when closely viewed, warrant the conviction that hooping-cough depends upon inflammatory irritation of the brain, or of its membranes, or of both. A somewhat similar opinion had been given by A. Leroy (*Méd. Maternelle*, 8vo. Paris, 1803.), Boisseau, Otto (*Nye Hygæa*, Aug. 1824.), and Begin (*Traité de Therapeutique, &c.* t. ii. 8vo. Paris, 1825.), have admitted the frequency of the association of cerebral affection with hooping-cough, even from the commencement; whilst they oppose the inference that the latter is dependent upon the former. Dr. Webster is, however, the first writer who fully appreciated the influence of cerebral irritation on the respiratory organs in this disease, and excited attention to an important and early complication of it.

33. M. Desruelles states, that hooping-cough is an inflammation of the bronchi, giving rise, at an early period of its course, to cerebral irritation; that, as long as the bronchitis is simple, the cough is not attended by the characteristic hoop; but that, when the cerebral irritation commences, the diaphragm and muscles of the larynx, &c., become subject to convulsive actions, which impress the cough with its peculiar features. The arguments already adduced against the inflammatory origin of the disease, are equally applicable to this view; and the constant existence of cerebral irritation is by no means proved — the occasional supervention of this irritation being all that is fully ascertained.

34. From my researches into the pathology and treatment of hooping-cough, during some years previously to 1823, I was led to consider the medulla oblongata or its membranes very early implicated in this disease; evidences of inflammatory irritation of these parts having been very generally observed in the *post mortem* inspections I had made. I conceived that the morbid impression or irritation occasioned by the exciting cause in the upper parts of the respiratory surfaces, particularly the glottis and its vicinity, affects the respiratory nerves, especially the pneumagastric; and that the irritation is extended to the origins of these nerves, where it aggravates and perpetuates the primary affection. Where no predisposing, concurrent, or consecutive causes or influences favourable to the developement of inflammatory action either in the respiratory organs or in the brain exist, the morbid action does not proceed beyond an irritative state, and the disease preserves a simple form. But when such causes are in operation, the irritation passes into inflammatory action in either of these situations; in some cases extending from the epiglottis and pharynx to the bronchi and lungs, and in others from the medulla oblongata to the brain or its membranes. As the irritation increases or extends downwards along the respiratory surfaces on the one hand, or to the pharynx and gastric mucous surface on the other, and as it predominates in the one above the other, so does the disease assume more of a bronchitic or of a gastric character; the latter form being the most favourable, as tending to disembarrass the bronchi, and to prevent the extension of disease in that direction. When the disorder implicates the lungs, the gastric affection either does not appear, or is thereby superseded; and when the brain becomes affected, either the gastric symptoms are not observed, or they assume different characters, appearing in the intervals between the fits of cough, instead of terminating the fits, and the cough loses its convulsive or nervous form. It does not, however, follow that the stomach is materially affected, even when the vomiting is the most remarkable. In these cases, the irritation seldom extends much beyond the pharynx; the irritation of this part and of the epiglottis, and the convulsive nature of the cough, being the principal causes of the vomiting. The copious discharge of ropy mucus, terminating the fit, partly proceeds from the pharynx and vicinity, even when there is no vomiting. Attentive observation subsequently to the adoption of these views, and extensive experience of the treatment founded on them, have confirmed my confidence in their accuracy, in the principal points.

35. I believe that the disease is chiefly nervous, in the simple cases; that it preserves this character more or less throughout, even when inflammatory complications ensue; and that, in the uncomplicated state, the nervous affection never proceeds beyond irritation. The impression made by the causes, is followed by functional

lesion of the respiratory nerves, particularly the nervus vagus; and, owing to this lesion, the mucous surfaces they supply frequently experience consecutive changes, as respects the state of circulation, exhalation, and secretion. Hence result increased vascular determination and augmented secretion, attended by irritation of the glottis, epiglottis, pharynx, and air-tubes, inducing convulsive action; which supervenes the more readily, as the disease is essentially nervous in its nature, but often becoming, consecutively, irritative, or inflammatory; this last characteristic being only an occasional complication, occurring from predisposition, habit of body, epidemic influence, or fortuitous causes favourable to its developement. — The inflammatory appearances in the medulla oblongata and base of the brain may be owing to the functional relation of these parts to the respiratory order of nerves, which receive the first impression of disease, and whose functions are so manifestly disordered throughout, as noticed above (§ 7.); or these, as well as the consecutive cerebral complications, may be induced by the disposition to disordered circulation, occasioned by the change in the state of nervous influence, and perhaps still more by the impeded return of blood from the brain during the paroxysms.—The vomiting so generally terminating the fit has been, as I have shown, imputed by many primarily to the stomach. But this symptom is often attendant upon severe fits of cough, whenever the epiglottis suffers unusual irritation. As it does not occur during the first days of the complaint, it seems to be owing to irritation of this part, which has been gradually coming on with the progress of the disease, until it reaches a pitch occasioning increased convulsive action of the respiratory muscles, extending to the diaphragm, the abdominal muscles, and stomach; the irritation of the morbidly sensible epiglottis by the cough increasing the paroxysm, until vomiting is produced.

36. II. DIAGNOSIS. — The existence of this complaint, particularly at an early stage, is not always readily ascertained. During the first period, it is not easily distinguished from a common cold. In most instances, however, the more paroxysmal nature of the cough, and the absence of fever, will indicate the affection, although the characteristic hoop is wanting. Occasionally this sign is absent altogether, in the slightest cases, although the disease is prevalent in a family; and yet there may be little doubt of the nature of the cough. Its more or less convulsive form, the perfect intervals, the evidence of congestion towards the head during the fit, and, as the complaint advances, the copious discharge of ropy mucus, are quite distinctive, although there is no complete hoop. When this latter sign is present, or when the paroxysms of cough terminate in vomiting, there can be no doubt as to the disease.

37. III. PROGNOSIS. — When the complaint is simple, the prognosis is favourable. But it may, at first, assume this form, and afterwards become complicated, and consequently more or less dangerous, owing to injudicious management, to various influences, and to its continuance; therefore a cautious or reserved opinion should be given as to the result in all the early stages. The complaint is, generally speaking, more dangerous, the younger the child; but the period of dentition aggravates the risk. When, however, the infant has a healthy nurse, and is itself of a good constitution, — if it have not recently suffered from any infantile complaint, or been lately weaned — if the attack commences in summer or spring, or in a mild dry season — if the intervals be complete, and of considerable duration — and if the paroxysms be attended by vomiting and a free excretion of mucus,— a favourable prognosis may be entertained. If the lungs or the head — the latter especially — betray disorder, — if the child belong to consumptive, scrofulous, or old asthmatic parents — if there be tendency to cerebral diseases in the family, — a cautious or an unfavourable opinion should be given. All the symptoms indicative of the more serious complications (§ 10,11.), are signs of danger. Upon the whole, the complaint is more favourable in adults than in infants, or even than in children; yet there is great risk, even in them, of the occurrence of pneumonia, bronchitis, or pleuritis; and, in young adults, of a scrofulous diathesis, of phthisis, or of hæmoptysis. It may cause abortion in pregnant females; and, in those who are hysterical, the cough may ultimately pass into an obstinate form of that complaint, and be removed with difficulty, especially if the circumstance be overlooked. The occurrence of the complaint during convalescence from measles or scarlatina is unfavourable, inasmuch as bronchitis and the other pulmonary complications are apt to ensue. — The presence of cerebral symptoms, or of fever or a quick respiration in the intervals, and a scanty excretion of mucus after the fits, indicate danger.

38. IV. CAUSES, &c.—*Of the causes and modes of propagation of hooping-cough* we have no very positive knowledge. The disease occurs either epidemically or sporadically, and often during seasons, and under circumstances, wherein catarrhal and pulmonary affections prevail. When it commences in autumn or winter, it is always of longer duration than at other seasons; and, like other catarrhal complaints, it is often prevalent in spring and summer. It generally affects several or many at the same time; particularly infants from two or three weeks old and upwards, and children till after the second dentition. It sometimes occurs in adults, and but rarely in the aged. Among adults, females are oftener attacked than males; those of the latter who are nervous, irritable, or approach the nearest to the female constitution, being the most susceptible of it. It affects persons only once; but rare instances of second attacks have been observed.

39. Hooping-cough, independently of its epidemical appearance, seems to possess infectious properties, which, although admitted by the majority of authors, have been disputed by a few. It is always quickly propagated through a family, and its extension, when sporadic, may be prevented by removing the unaffected children. Mothers, nurses, and even fathers, who have not had the disease, will often contract it from their children; and I have known mothers, who had had it in their childhood, affected a second time by a child at the breast, or by its prevalence amongst the other children. Its infectious properties are further shown, by a child having caught it from others, at school or at nurse, and, when removed under the

disease to a distant part of the country, and into a family where it did not exist, communicating it readily to those who had not had it. Like all infectious maladies, it is much more rapidly propagated during certain constitutions of the air, particularly those in which catarrhal complaints are frequent, or when measles prevail, than in others. In its epidemic form, its infectious property appears to be most fully marked, from the circumstance, probably, of the concurring causes, whatever they are, being then more active, as well as from the predisposition these epidemic states occasion. Pertussis has also been frequently observed to follow, epidemically, upon epidemic morbilli. When it occurs sporadically, and during healthy states of the atmosphere, it often fails to be propagated, unless to those most predisposed. Moreover, it is often necessary to infection that the breath of the affected subject should be inspired by the unaffected; and that the disease should, at the time, be fully developed. The infectious property seems to diminish as the disease declines. Dr. Cullen and many others believed that it disappeared in from four to six weeks; but, as Dr. Elliotson remarks, the period cannot be fixed with any precision. It is generally from five to seven or nine days, or even longer, after exposure to infection, that the cough commences.

40. V. Treatment. — There are few maladies against which a greater array and variety of means, both medicinal and regimenal, have been recommended, than against hooping-cough. Vascular depletion, emetics, purgatives, diaphoretics, antispasmodics, excitants, internal and external irritants, &c., have been severally prescribed as unfailing agents, and combined, in infinite forms, in the treatment of this complaint. Although these may be extremely beneficial, they may be also most mischievous; success entirely depending upon their application appropriately to the peculiarities of individual cases. As the disease is variously modified and complicated, so it cannot be removed by a particular class of remedies, or by a specific form of treatment. Means inappropriately employed, may convert a simple and slight case into one both complicated and dangerous. — There are certain considerations requisite to a successful treatment of this complaint; and these should always be kept in view, not only in it, but also in all other epidemic maladies. I refer especially to the constitution and habit of body of the patient, to the character of the prevailing epidemic, to the nature of existing complications, and to the period and progress of the disease. It is owing to these circumstances, that the means which are beneficial in one case, or in one season, are often injurious in others. Thus the epidemics of spring or winter more frequently require vascular depletion, than those of summer and autumn, whilst these latter derive more benefit from emetics than the former. So important are the complications of pertussis, that the treatment should be mainly directed to their prevention or removal; and whatever they may be — whether bronchitis, pneumonia, congestion or inflammation of the brain, &c. — it should be recollected that they are much more dangerous, than when occurring primarily or in a state of previous health, unattended by the aggravating circumstances of this complaint.

41. i. *Treatment of Simple Hooping-cough.* — In the slighter cases, little more is required than attention to diet, regimen, and the excretions, unless the child be plethoric, when additional means will be necessary. — *a.* In the *first stage*, a dose of *rhubarb* with *hydrarg. cum creta* or *calomel*, and a little *ipecacuanha*, may be given every night, occasionally interposing an *emetic*. The *diet* should be farinaceous, with milk. The child ought to be confined to a mild, equable temperature, and wear flannel next the skin, in winter, spring, or autumn. If the patient be plethoric, it will be proper, as a precaution, to apply *leeches*, according to his age, either behind the ears or over the sternum, as the head, or respiratory organs, may indicate a disposition to be affected. In the more severe attacks, also, this measure should never be neglected; and *diaphoretics*, with small doses of *antimony*, or of *ipecacuanha*, ought to be given every four or five hours; the secretions and excretions being duly promoted by calomel and rhubarb every night, and a stomachic *purgative*, or an emetic, each second or third morning, according to circumstances.

42. *b.* In the *second stage* of simple pertussis, an *anodyne* may be added to the diaphoretic mixture, and taken every four hours. If no sign of cerebral or pulmonary affection appear, the *hydrarg. cum creta* may be substituted for calomel, in the night-powder. It is in this period, that the treatment recommended by Dr. Pearson is most serviceable. This consists of an antimonial *emetic*, followed by a draught containing a drop of tincture of *opium*, five drops of *ipecacuanha* wine, and two grains of *carbonate of soda*, for a child of one or two years of age. This draught is to be repeated every four or five hours for several days; the bowels being kept open by rhubarb and calomel. As the cough declines, he lessens the opiate, and gives *myrrh* in place of the ipecacuanha wine. This treatment is excellent for children of three or four years of age or upwards: but until they reach two or three years, opium ought not to be given. For those of the age mentioned by Dr. Pearson, I consider the extract or syrup of *poppy*, or *conium*, or *henbane*, to be preferable. The *liquor potassæ*, also, will be often advantageously substituted for the soda. The *decoctum senegæ*, or the *infusum valerianæ* may be given in this and the next stage with some aromatic water, and an antispasmodic. It will be sometimes of service, even in this stage, to exhibit an *emetic*, if the fits do not terminate in vomiting; and, unless the attack is slight, the same *diet* and *regimen*, as directed in the first stage, should be continued in this. A principal indication in both is to watch the first sign of visceral disease, and to oppose its accession by leeches applied in either of the situations just named, and by emetics. In both periods, also, advantage will accrue from the warm semicupium or pediluvium at bed-time; but, unless the case become severe, it will only be occasionally required. — The excretions should always be promoted by mild and stomachic purgatives.

43. *c.* In the *third stage*, the chief indications are to strengthen the system, and to supersede the convulsive character of the affection, by giving *tonics* with *antispasmodics* and *anodynes*. The gentler tonics may be first employed, and successively those which are more energetic, in conjunction with preparations of *poppy*, or with

paregoric, or with *conium*, *hyoscyanus*, *laurel water*, &c. There are numerous medicines belonging to these classes that may be given with great advantage in this stage, but they will be noticed hereafter.—*Tonics*, as well as antispasmodics or anodynes, will be advantageously exhibited with the *alkaline subcarbonates*, or with *liquor potassæ*, or Brandish's alkaline solution; and *purgatives* beneficially conjoined with vegetable bitters or other tonics. If the disease assume a periodic or intermittent type, the preparations of *bark* or *quinine* should be prescribed.— It is principally in this stage, that *change of air* proves so serviceable. It should not be neglected, particularly when this period and convalescence are protracted. In both this and the preceding stage, *embrocations* or *liniments* of a rubefacient and antispasmodic kind (see *Append*. F. 295, *et seq.*), applied to, or rubbed upon, the spine, will prove very serviceable.—*Sinapisms* will also sometimes be of use, especially in threatened bronchitis; and, in young, delicate, or irritable children, are preferable to blisters and the tartarised antimonial ointment, from which I have seen dangerous consequences accrue in patients of this description.

44. ii. *Complicated Hooping-cough.* — *A*. The most common complication is with *inflammation of the bronchial mucous membrane*. But this may not be the only associated inflammation; for *pneumonia*, or *pleuritis*, or even both, may be superadded to it, — a contingency to which the practitioner should be always alive. If *simple bronchitis* (§ 6.) be alone present, *local depletions*, in addition to the treatment already directed, must be prescribed; and *antimonial wine*, with the solution of the acetate of ammonia and camphor julap, should be taken every third or fourth hour. In young children, however, ipecacuanha wine should be preferred to antimony. A small dose of calomel, with or without ipecacuanha, rhubarb, or jalap, may be given every night, or night and morning, according to circumstances; guarding, however, against too great an action on the bowels. After depletions have been sufficiently employed, *sinapisms* or *blisters* applied for a few hours, or until erubescence of the surface is produced, and then followed by warm poultices, will be very serviceable. The warm *semicupium* may also be resorted to at bed-time. An ipecacuanha *emetic*, when expectoration is difficult, or twice or thrice a week, will also be beneficial. After the inflammatory symptoms are removed, any of the *anodynes* recommended above may be added to the diaphoretic mixture, an *embrocation* or *liniment* (F. 297. 300. 311.) applied along the spine, and the complaint treated, in the *second* and *third stages* especially, as advised for the simple disease.

45. *B*. In the complication with *pneumonia* or *pleuritis*, or with both (§ 14—18.), more decided *depletion* will generally be requisite, than in the bronchitic form. But it must not be overlooked, that these inflammations are seldom present in pertussis without more or less bronchitis. In this, as in the other pulmonic complications, *cupping* over the sternum, or between the shoulders, is a preferable mode of depletion to the application of leeches; and, in a far advanced stage of these inflammations, either after blood has been freely abstracted, or when excessive secretion into, or accumulation of viscid fluid in, the bronchi threatens suffocation, *dry cupping* between the shoulders is the next efficient means to a stimulating emetic. A purplish hue of the lips or cheeks, and dilatations of the nostrils, should not prevent depletion, if it is otherwise indicated, particularly in plethoric children, if it have not already been practised, and if the skin be hot and the pulse not much reduced in strength. When the substance of the lungs, or pleura, becomes inflamed, *calomel*, with or without ipecacuanha, should be given in larger and more frequent doses, than when the bronchi only are implicated, and the diaphoretic mixture should contain an antimonial preparation. This last, however, ought to be given with caution in infants or young children, for I have seen most serious effects produced in them by large doses of tartarised antimony, particularly when too often exhibited, or too long persisted in. In this complication, *sinapisms* and *blisters* prescribed as above (§ 16.) are beneficial after vascular depletion has been pushed sufficiently far; but, in many cases, much greater benefit will accrue from the application of the *warm turpentine epithem* on the chest or between the shoulders, or from one of the *liniments* (F. 297. 300. 311.) already noticed, employed in the form of an embrocation.—Having removed the existing complication, the subsequent treatment must entirely depend upon the peculiarities of the case. The *diet* and *regimen* should be strictly enforced, and the patient kept in a mild and equable temperature. The semicupium, or warm bath, gentle *diaphoretics* with *diuretics* and anodynes, and, as the disease declines, mild *tonics* with *sedatives* and *antispasmodics*, will also be of great service. The excretions should be kept free, and change of air advised as soon as it can be safely attempted.

46. *C*. *The complication with cerebral affection* must be promptly met by the application of *leeches* behind the ears or to the occiput, or by *cupping* in this situation or on the nape, according to the age of the patient and the severity of the complication. Whenever the simple form of pertussis has presented such severity as to render the occurrence of pulmonic or cerebral affection at all probable, and more especially if the child have been plethoric, I have always directed *leeches* to be applied behind the ears or to the occiput, influenced by the views as to the pathology of the complaint already stated; and I have had the greatest reason to strongly recommend this practice. When hooping-cough is aggravated by *teething*, the cerebral complication should be dreaded, although neither *convulsions*, nor any other very prominent symptom of it, may have appeared. In these cases, the gums ought to be attentively examined, and scarified as they may require it. If the infant be at the breast, the nurse's milk and health should receive attention. The secretions and excretions of the patient must be most actively promoted by full doses of *calomel* with *James's powder*, by *purgatives*, and cathartic enemata. The temperature of the head should be reduced by the *cold affusion* on it, or by cold-sponging whenever either becomes necessary, and the means advised for *Inflammations of the* Brain (§ 191.), and for *Acute Hydrocephalus* (see Dropsy *of the Head*, § 260.), ought to be employed according to the circumstances insisted upon at these places. The objects are to remove incipient mischief, and to

prevent thereby the accession of a formidable malady, by a prompt application of efficient means. To wait until the coming evil has fully declared itself, is to sacrifice the principal chances of success; for all cerebral affections that supervene during pertussis are much more dangerous than those which occur primarily. As soon as the complicated affection is removed, change of air should be recommended. Nothing is so advantageous as a complete change of air for children treated in London, or in other large towns.

47. *D. Infantile remittent fever* generally does not appear in connection with pertussis until an advanced stage of the latter. Other associated affections, as *chronic pulmonary disease, curvatures of the spine, rickets, affections of the joints, enlargement of the mesenteric or of the absorbent glands, &c.*, are sometimes also met with in protracted cases of hooping-cough, or in the stage of decline, particularly when the disease has been neglected, or when the morbid affection has been perpetuated by habit, or by the neglect of such means as are calculated to break the chain of disordered action. They often also may be traced to constitutional vice or predisposition, and to neglect of the excreting functions. Under whatever circumstance, either these or the remittent fever may occur in the advanced course of hooping-cough, debility is a principal element of the complicated malady. The functions of digestion and respiration, and consequently assimilation and nutrition, having been more or less impaired during the early stage of the primary disease, inherent vice, or an existing disposition to disorder, the more readily manifests itself. As constitutional power sinks, maladies, which most commonly arise from debility, make their appearance; the particular malady being determined in its occurrence by hereditary taint, or by previous disorder. In many cases, the superinduced affection is merely a sequela of pertussis; but in others, the characteristic symptoms of the primary disorder still continue in a very pertinacious manner.

48. The remittent febrile disorder depends, in several instances, upon chronic irritation of the digestive mucous surface; in others, upon the state of the season or weather, and the influence of exhalations from a humid soil, or upon a moist and cold atmosphere; and in some, upon both conjoined. But whatever may be the source, it cannot be doubted, that debility is an important part of the disorder, and that the alvine secretions and excretions are much disordered. At the same time, therefore, that a treatment appropriate to the affection of the digestive canal is requisite, the state of constitutional power must receive attention. *Purgatives* are generally necessary in this complication, especially at an early period of it; but they ought to be of a stomachic kind, or combined with *tonics*, and neither be too irritating, nor too pertinaciously directed. The compound infusions of gentian and of senna, with sulphate of potash; rhubarb with this latter, in an aromatic water; hydrargyrum cum creta, or blue pill, with ipecacuanha, at bedtime — either of the preceding, or castor oil, being taken in the morning; are amongst the most suitable purgatives; and they should be repeated according to the state of the stools. If the bowels be irritable, or dysenteric, a full dose of calomel or hydrarg. cum creta, with the compound ipecacuanha powder, should be first given, having in some cases premised an ipecacuanha emetic. Some hours afterwards, a dose of castor oil ought to be taken, and its operation promoted by an emollient injection. After the intestinal canal is evacuated, irritation should be allayed by mild tonics, conjoined with aromatics, absorbents, sedatives, or antispasmodics, according to the peculiarities of the case. Preparations of cinchona, quinine, chalybeates, &c. will subsequently be of service. The decoction of bark, or any tonic infusion, will be advantageously given with liquor potassæ, or Brandish's alkaline solution; and afterwards the ammonio-chloride or potassio-tartrate of iron, and change of air, will generally prove most beneficial.

49. Although this treatment is recommended, chiefly with the view of preventing hooping-cough from lapsing into, or becoming associated with, infantile remittent, and of removing this complication, yet it will be equally serviceable in the prevention of the other *sequelæ* of the complaint mentioned above (§ 47.). When *affections of the joints, rickets,* or *mesenteric disorder* either supervene upon, or follow, an advanced stage of pertussis, the preparations of *iodine*, and other means directed for these complaints, should be resorted to. *Affections of the spine* are generally owing to weakness of the muscles and ligaments of the vertebral column, induced by this disease; or to scrofulous inflammation of some portion of the column itself. When the disorder is attributable chiefly to the former of these causes, then the *tonics* already recommended, *salt water bathing, sea air,* and *frictions* with stimulating liniments along the spine, will be very serviceable; and when the more solid structure of the column is implicated, then the preparations of iodine, Brandish's alkaline solution, or the *liquor potassæ*, and change of air, should be severally prescribed, as circumstances will suggest.

50. iii. *Of the more Specific Modes of Treatment advised for Hooping-Cough, and the Circumstances in which they are admissible or appropriate.* — Willis and Sydenham directed *bloodletting* in the plethoric and inflammatory cases, *emetics* of the oxymel of squills, *purgatives*, and *blisters* to the nape of the neck or between the shoulders. Willis also prescribed *tonics* during the decline of the complaint. He particularly notices the *Muscus pyxidatus*, or *M. Pyxioides*, the *Lichen pyxidatus* of Tournefort, or cup-moss, as a very popular remedy in hooping-cough. Gerarde remarks that "the powder of this mosse, given for certaine daies together, is a most certaine remedy for that perillous malady the chin-cough." Dilenius praised the powder of it, when frequently given; and supported his opinion by the authority of Willis and Gerarde. Other writers have prescribed it in the form of decoction in milk. Van Woensel (*Hist. de la Soc. Roy. de la Méd.* t. ii. p. 294.) recommended it in decoction, sweetened with syrup of mint. Baglivi employed also the *Muscus arboreus* and *M. querneus* in pertussis, in the form of decoction; and a syrup prepared from the decoction exists in the *Pharmacopœia Wittembergensis*, to facilitate its exhibition to children. Stoll (*Rat. Med.* vol. vi. p. 6.) found these mosses or lichens, particularly that growing on the oak, very serviceable in the hooping-cough which was epidemic in Vienna in the spring of 1775; Frank also praises it.

51. De Haen, in a letter written in 1747 to Van Swieten, describes a very prevalent and fatal epidemic hooping-cough. Children from a few weeks to ten years of age were chiefly affected, but adults were occasionally also seized. When one child was attacked in a family, none escaped who had not had the disease previously. It was often protracted to three, four, or even six months. He states that vascular depletion in the plethoric, purgatives, ipecacuanha, anodyne emulsions, opiates, oxymel of squills, nitre, &c. were severally employed, but with no marked success. He subsequently, with his colleagues, Ouwens, Westerhoff, and Velsen, was induced to prescribe the *Kermes mineral*, by the benefit derived from it in spasmodic asthma. To a child of six months, he commenced with one grain in the 24 hours, given in sugar and divided into three powders,—to a child of one year, two grains, in the same period,—and to a child of three years, three grains, increasing the dose gradually and cautiously. The success of this medicine he describes as most astonishing. In another letter similarly addressed, in 1751, De Haen remarks that, although he had found the *Kermes mineral* of very great service in the hooping-cough of that autumn, it was less so than in the epidemic of 1747: and he adds—"Plerique vero curantur *Limacum*[*] lacte coctarum largo atque protracto usu." (A. De Haen, *Opusc. quæd. inedita, &c. Cur.* J. Eyerel, P. i. Vind. 1795, p. 42. 173.) In another work (*Rat. Med.* t. iv. p. 121.) he notices a case in which the fit of cough terminated in suffocation: but the means usually resorted to in suspended animation having been employed, restoration and recovery took place.

52. Stoll states that he never saw sporadic cases of pertussis in Vienna up to the year 1777. The disease had previously appeared only in epidemic forms, and generally with modified characters. At some seasons the stomach, at others the head, and sometimes the lungs, were especially deranged. Occasionally it was attended by a miliary, and in some instances by a scarlet, eruption. In a few cases urticaria and erysipelas occurred. In Vienna and Hungary, it generally evinced a stomachic origin.—The epidemic of 1775 frequently affected adults. The paroxysms were most severe on alternate days, and during the night; and peripneumonia was a frequent complication. He states, that bloodletting, emetics, purgatives, emollients, and opiates, especially this last, were prescribed without benefit. Blistering, however, between the shoulders, and bleeding, were beneficial when the disease was about to pass into pneumonia. He observed the injurious effects of stimulating expectorants in favouring the developement of pneumonia, with which pertussis is so apt to become complicated.—Tonics were generally required, as early as debility became apparent; and, even after the disease was removed, they were often necessary. When the bowels were not freely open, they were conjoined with aperients.—In the epidemic of 1779, all the cases in which the fits terminated in vomiting recovered. Stoll found ammonia, gum ammoniacum, and Venetian soap, given in simple oxymel, or oxymel of squills, of service. Decoctions of emollient herbs and roots, and of the flowers of arnica, were also beneficial. Opiates were productive of mischief in many cases, and even of fatal effects in some, a glutinous effusion having been found in the bronchi of such cases.—During the epidemic in Copenhagen in 1784, Bang made trial of the *cicuta*, after the exhibition of *emetics*; but with temporary advantage only. Towards the decline of the disease, *musk* was found of service.

53. Dr. Huxham introduced the use of *mercurial purges*. After their operation he prescribed the *Peruvian bark*. Dr. Bisset commenced the treatment with an *emetic* of oxymel of squills, followed by rhubarb, manna, &c. As soon as the severity of the complaint began to subside, and the intervals between the fits to be prolonged, he gave the bark.—The propriety of having recourse to *emetics* was advocated by Hoffmann, Forbes, Aaskow, Navier, Amstein, Hufeland, and others. The substances usually employed as emetics were ipecacuan, tartar emetic, Kermes mineral, and oxymel of squills. They were generally exhibited at the commencement of the treatment, and occasionally in the course of the complaint. Lafosse and Remer gave them only at the commencement. Ipecacuanha was preferred by Linnæus, Aaskow, Thilenius, Weber, and many others; and oxymel of squills by Melzer.—Stoll considered emetics to be especially serviceable in hooping-cough during summer or autumn. Struve directed them in the evening; and Sims, after bloodletting.—Lettsom believed them to be useless, and Jones and Niemann to be absolutely injurious. Burton was amongst the first to condemn them, and he no less objected to bloodletting and cathartics, unless in inflammatory cases. In their stead he prescribed a mixture, the most active ingredient of which was tincture of cantharides. There can be little doubt of emetics having been occasionally abused by inappropriate exhibition; but experience has proved them to be most serviceable in this complaint, when judiciously employed.—At the present day, the means advised by Borsieri are the most generally applicable, and therefore the best, as far as it goes, that can be adopted. He prescribed a smaller or larger emission of blood early in the disease; a gentle emetic, occasionally repeated, where there is no symptom forbidding it; aperients of calomel, rhubarb, or manna, and external irritants. The only fault that can be found with this treatment, is the neglect of demulcents, anodynes, and antispasmodics, which are very generally beneficial in an advanced stage of the complaint.

54. Dr. Darwin insisted upon the frequent occurrence of peripneumonia during hooping-cough; and he therefore directed *leeches*, to prevent, as well as to remove, this complication. After evacuating the bowels, and giving diluents, and when the complaint had reached the second stage, he prescribed, for a child of about three years, a sixth of a grain of calomel, a sixth of a grain of opium, and two grains of rhubarb, twice a day. The only objection to this treatment is the too general use of opium

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[*] Appended to a case treated by Stoll, the history of which is given by Eyerel (*Op. cit.* t. ii. p. 184.), is the following note: — Decoctum *limacum*, in epidemica tussi convulsiva egregium et unicum sæpe fuit remedium, teste Haenio, qui a fœmina rustica Hagæ Batavorum id didicit. Adfuere aliæ epidemiæ ubi nil juvit, sed ubi Kermes mineralis et opium omnem absolvit paginam,—Decoctum hoc limacum per octo dies repetatur.

and the amount of the dose of it, for a child: in combination, however, with calomel, it is much less injurious than when given alone. He likewise employed antimonial emetics, mild cathartics, cool air, repeated blisters, or the tincture of cantharides internally, warm bathing, the inhalation of the steam of warm water containing a little vinegar, opiates in small doses, and digitalis. He prescribed digitalis, whenever a tendency to inflammation, or to effusion, or to pulmonary consumption appeared. He considered, with much justice, *diuretics* to be more or less useful in this, as in other disorders implicating the respiratory organs. Dr. Elliotson has very properly contended, that, wherever there is oppression of breathing, with violent spasmodic attacks of cough, accelerated pulse, and sonorous or crepitous rattle, inflammation of the respiratory organs is present, and should be treated by bleeding, by emetics, and by calomel. In such cases, sedatives and antispasmodics ought not to be resorted to, until inflammatory action is removed, and the secretions and excretions are freely evacuated.—It is unnecessary to allude further to the various modifications of treatment adopted by other experienced physicians. I shall, therefore, only notice some of the principal remedies prescribed for this complaint.

55. iv. *a. Bloodletting* was directed early in hooping-cough, by the great majority of writers, since the time of Sydenham to the present day; and frequently even in slight and simple cases, as a precautionary measure, particularly in plethoric habits. Lettsom has justly remarked, that, if it be not resorted to early in the complaint, it is seldom of service at an advanced period; but cases in which inflammatory affections of the lungs or brain arise at this period, furnish exceptions to this rule. Stoll prescribed depletion chiefly when the lungs became affected. Hufeland directed *leeches* to the chest; and Webster, to the temples, in most cases. I have seldom omitted to apply them behind the ears, or between the nape and occiput, or to prescribe *cupping* in this situation, at an early stage, influenced by the reasons stated above (§ 35.).— Of *emetics*, mention has already been made (41. 44.). — *Purgatives* have been employed chiefly with the view of evacuating accumulations of fæces, and of promoting the secretions and excretions. *Calomel* has been very generally recommended, both as an aperient and as an alterative. Fischer and Hargens gave it alone; but it has been more generally conjoined with rhubarb or some other purgative; and, in the inflammatory complications, with James's powder, ipecacuanha, &c. Darwin and Stroem prescribed it with rhubarb and opium; in which combination it is often beneficial at an advanced stage, and in patients above four or five years of age. The frequent use of *laxatives* or mild purgatives has been much insisted upon by Michaëlis and Kortum. — *Cathartic* or *irritating enemata* have been resorted to by Holdefreund and Hufeland.

56. *b. Diaphoretics and expectorants* have been generally employed through the course of the complaint; the former at the earlier, the latter at more advanced, periods. Some of these medicines promote both perspiration and expectoration, and are hence the more serviceable in severe or complicated states of the complaint. — *Antimonials,* in small doses, were praised by Fothergill, Weber, and many others. The solution of tartar emetic was employed by Hirschel; the golden sulphuret of antimony was preferred by Closius and Hannes. Van de Sande and Unzer gave it after having premised emetics, and Holdefreund conjoined it with sugar of milk. — The *Kermes mineral* was prescribed by De Haen, Hargens, Kortum, Hinze, and Styx. Quarin gave it with the flour of sulphur, gum-arabic, and extract of liquorice; but, although formerly in great repute in febrile and pulmonary diseases, it is now seldom employed. The following powder was once much used on the Continent for the cure of this complaint: —

No. 257. ℞ Kermes Mineralis, Pulv. Ipecacuanhæ, āā gr. j.; Ocul. Cancror. pulv. et Pulv. Acaciæ āā ℈j. Tere bene, et divide in Cartulas vj., quarum capiat unam sextis horis.

57. This dose was prescribed for a child of one or two years. Much of the virtues of these powders was clearly attributable to the *ipecacuanha,* which is one of the most serviceable medicines employed for hooping-cough. — Hennings and Keutsch relied chiefly upon it, and gave it in minute and frequent doses. Hargens ordered it in considerable quantities; Krebs, in the form of infusion; Vogler, with opium, magnesia, gum arabic, and sugar; and Pearson, with opium and soda. — *Ammoniacum* and *squills* have been used as expectorants; but they require much caution, for, in the more inflammatory states of the complaint, they may aggravate the disorder, or even favour the occurrence of inflammatory action, in plethoric habits, or when the phlogistic diathesis is present. The *oxymel of squills* was frequently employed as an emetic, and often with benefit. Hufeland and Sulzer gave it with cinchona and extract of hyoscyamus, in the advanced stages of the complaint.

58. *c.* Numerous *antispasmodics* have been prescribed in the *second* and *third stages,* on account of the convulsive character of the affection. — *Assafœtida* was recommended by Millar; but was considered useless by Hufeland. *Castor* was given by Morris and Horn; *musk,* by Conradi, Gesner, Wolff, Von Berger, Hufeland, and Horn. Marcus conjoined musk with the sulphuret of antimony and magnesia. The *oxide of zinc* was praised by Crell, Percival, and Hart. Scheidemantel very judiciously employed it after evacuations. Winckler and Tode gave it with cinchona; and Starke, with cream of tartar; but, from this combination, tartrate of zinc must have been formed. Hargens, however, considered it inefficacious. I have but little experience of its effects in this complaint. *Camphor,* in very small doses, with diaphoretics, at an early period; and in larger quantities, with anodynes, other antispasmodics, or tonics, is often of great service, particularly after moderate depletion and alvine evacuations. The *subcarbonates of the alkalies* were given by Hinze, Memminger, Pearson, and Keutsch, and are often important adjuvants, in conjunction with hyoscyamus or other narcotics, and with rhubarb or other aperients, in the treatment of the second and third stages. I have, however, often preferred the *liquor potassæ* or Brandish's alkaline solution; especially in the scrofulous diathesis, and in cachectic habits. The subcarbonate of *ammonia,* in small doses, and other preparations of ammonia,

are frequently beneficial in cases of debility at an advanced period, or when the complaint is protracted. *Muriate of ammonia* was recommended by Stoll, at an early stage, with oxymel. I have found it an excellent refrigerant antispasmodic and tonic, in several instances.

59. *d.* The most energetic *narcotics* and *anodynes* have been prescribed, with a view of allaying spasmodic action, and generally in conjunction with some one of the antispasmodics or diaphoretics already noticed. *Opiates* were given by De Haen, with camphor and musk; by Hufeland, in the form of Dover's powder; by Jacob, with pectoral elixirs and spirits of nitric æther; by Rüling, similarly combined, after four or five emetics; and by Lefosse and Lettsom, in the second and third stages, with cinchona. Willan employed a watery extract of opium; and Brera used it externally in frictions or in liniments. O the various preparations and combinations of opium, the paregoric elixir is indisputably the best in hooping-cough, especially when given with an alkaline subcarbonate, in almond or mucilaginous emulsions. The extract of the *lactuca virosa* was praised for this complaint by Dr. Gumprecht and others; and it has been much employed by some practitioners. *Conium* was first prescribed for hooping-cough by Dr. Stoerck and Dr. Butter. It was afterwards used by Ranoë, Schneider, and Hufeland. — Lettsom and Hargens considered it devoid of efficacy. I have prescribed it in numerous cases, and believe it beneficial when its virtues are not injured by preparation or age. It should not be given in the first stage.—*Hyoscyamus* was recommended by Wolff, Wigand, and Joerdens; and by Fischer, with vegetable bitters. It is nearly as beneficial as conium; but, in some patients, it is more liable to affect the head.

60. *Belladonna* has been extensively tried by Continental physicians in pertussis, and the powder of its root was most commonly employed; particularly by Ranoë, Buchhaave, Frank, Meglin, and Ettmüller; and by Laennec after the operation of emetics. Schaeffer and Widemann gave it in large doses, and considered that it was quite a specific, particularly when administered in enemata. This is, however, a somewhat dangerous mode of prescribing it. The minute doses, recommended by Wezler and Hufeland, are much more judicious.—The extract of *tobacco* has likewise been prescribed by Gesner, Thilenius, and Hufeland; but it also requires much caution, and ought not to be tried with young children. The tincture of *Lobelia inflata* has been employed by Dr. Andrews, with benefit. When the convulsive cough is aggravated by the accumulation of viscid mucus in the bronchi, the exhibition of this medicine, until it produces vomiting, will be of great service. *Colchicum* was praised by Haden and Alcock; and, when cautiously given in conjunction with magnesia, or the alkaline carbonates, or with either of the antispasmodics noticed above (§ 58.) it is of service in the inflammatory complications; but it may be very injurious in other circumstances, and particularly in very young patients. The same remarks apply to *digitalis*, as prescribed by Drake and Darwin. *Hydrocyanic acid* has also been recommended by Dr. Granville and Dr. Elliotson. I have seen much benefit derived from it, in the advanced stages of the complaint, particularly when given in conjunction with camphor, or with gentle tonics or demulcents. It should be most cautiously tried, if tried at all, with young children. Dr. Elliotson, however, remarks, that a minim may be added to an ounce or two of almond emulsion, and a teaspoonful of this given them three or four times a day. *Laurel water* was much employed in hooping-cough by Continental physicians, and is still preferred by many to prussic acid.

61. *e.* Amongst *stimulants*, the tincture of *cantharides* has been most frequently employed. It was praised by Forbes, Schaeffer, and Ploucquet; and was prescribed with camphor and extract of bark, by Burton; with antispasmodics and anodynes, by Wolff, Widemann, and Hufeland; with preparations of cinchona, by Chalmers; and with these and paregoric, by Lettsom aud Graves. I have prescribed it in a number of cases, and have found it diminish the frequency and severity of the fits, in the nervous states of the complaint, particularly when it occasioned irritation of the urinary organs. The extract of *nux vomica* was recommended by Michaëlis and Hufeland, conjoined with the extract of *Carduus benedictus*. I have tried it with manifest advantage, in circumstances similar to those in which cantharides was employed. But neither the one nor the other ought to be resorted to in the first stage, or in the inflammatory complications. *Guaiacum* has been prescribed for pertussis, chiefly by Hufeland and Veizhans; and *saffron* with castor, after due evacuations, by Theussink and Hargens. *Castor* was itself much employed by Sauvages, Morris, and Horn; and a decoction of unroasted *coffee* was given by Hufeland. The *muriate of barytes* has also been noticed with commendation, by the writers just named.

62. *f.* The propriety of having recourse to *tonics* in the second and third stages, particularly the latter, cannot be disputed; but they ought not to be prematurely prescribed, especially in the second stage, and whilst a phlogistic diathesis is present even in the slightest degree. Of the various tonics, the preparations of *cinchona* are certainly the best. The infusion may be first given, conjoined with the solution of the acetate of ammonia, and subsequently the decoction with liquor potassæ or the subcarbonate of soda. The extract of conium or hyoscyamus, or paregoric elixir, may be added to either of these. *Bark* was strongly recommended by Quarin, Courbette, and Holdefreund. Hannes gave it with the sulphuret of antimony, and administered it in enemata; and Sauvages and Morris, with castor; Bisset, Stoll, Aaskow, Weber, and Michaëlis, very judiciously premised sanguineous depletions, emetics, and purgatives, before they ventured upon it. Murray and Hufeland gave it with cantharides in the latter stages. It is much more beneficial in some epidemics than in others. When the complaint is protracted, and assumes an intermittent or periodic type, particularly a tertian form, quinine, or cinchona ought never to be omitted.—The *arsenical solution* has also been employed in circumstances requiring the bark. It was much recommended by Ferriar and Simmons, and is undoubtedly of service in these: but it is not superior to cinchona; and in children, especially, it is a much more hazardous substance. — I have given the *sulphate of*

zinc with great benefit in some cases; and the *nitrate of silver*, triturated with *extract of hop* or of hyoscyamus, with equal advantage in others. The *sulphate of iron* was very favourably noticed by Dr. Stanger, and is an excellent medicine in the third stage, or purely nervous state of the complaint; but it is not superior to the other preparations of iron, particularly the *ammonio-chloride*, and the *potassio-tartrate*.

63. *g*. There are various other medicines which have been employed internally against hooping-cough; but these require only a simple enumeration. Of the *Lichen pyxidatus*, mention has already been made (§ 50.) The *Lichen cocciferus* was recommended by Forbes and Von Woenzel; and the *L. Islandicus* by Weber. The *Ledum palustre*, *Tilea Europæa*, and *althæa officinalis* were prescribed by Wahlbom, Linnæus, Walter, and Wahlin; the *Geum urbanum*, by Keck and Buchhaave; *Phellandrium aquaticum*, by Van der Bosch; an infusion or extract of the *Narcissus pseudonarcissus*, by Dufresnoy; an extract of the *Mesembryanthemum*, by Wendt; and an extract of the *Cardamine pratensis*, by Comhaire and Veillecheze.—*Isinglass* was used in this complaint, by Heineken and Gautieri; *acetate of lead*, in small doses, by Forbes; *oxide of zinc*, with cicuta or belladonna, by Guersent, diluted *acetic acid*, with sugar, by Hannes; *sulphur*, by Sydenham, Quarin, and Unzer; and the *sulphuret of potass*, by several Continental physicians.

64. *h*. There are few complaints in which *external medication* has been so extensively or so beneficially employed, as in this. Although the *inhalation* of simple or medicated watery vapours does not strictly come under this head, I may here state, that it has been advised by Pearson, Darwin, and others. The observations as to this practice, in the article on *Inflammations of the* Bronchi (see that article), and as to the medicines that may used in this manner, entirely apply to hooping-cough. In the early stage, the vapour to be inhaled should be either simple or merely emollient. In the latter stages it may be slightly impregnated with camphor, or with some narcotic; but this practice can seldom be adopted for young children. The inhalation, in early or inflammatory states of the complaint, of stimulating vapours, is always injurious.

65. *i*. *External irritants* of various kinds have been prescribed. *Blisters* were applied to the chest, and between the shoulders, by De Meza, Paldamus, Quarin, and others; but the precautions stated above (§ 44.) should be observed, particularly in cases of infants and young children. Knebel directed *rubefacients* to the nape of the neck; Pelargus and Hufeland, to the lower extremities; Henning and Hecker, to the epigastrium; and Durr, to the soles of the feet. Various substances have been employed as external irritants. Henning recommended a cataplasm containing scraped *horseradish*; Struve, a liniment with tincture of *cantharides* and *tartar emetic*; and Zadig, the tincture of *ginger* applied to the epigastrium. Autenrieth prescribed an ointment containing tartar emetic to be rubbed upon the chest, or between the shoulders, or upon the epigastrium; and this practice was adopted by Kelch, Merrem, Nolde, and Michaëlis; but Horn and Schneider found it productive of little or no benefit. Autenrieth has received the credit of being the first to employ tartar emetic as an external irritant; but it was thus recommended long previously, by the older Monro. I have seen the incautious use of this ointment productive of dangerous, and even of fatal sloughing, in debilitated or cachectic children and infants. Loebenstein-Loebel advised a liniment containing a solution of *phosphorus* in oil of cummin and camphor to be applied on the epigastric region. From an extensive experience of external irritants in the treatment of pertussis, I prefer the *semicupium* or *pediluvium*, mustard and salt having been put into the water; the occasional application of a *mustard poultice* to the chest or epigastrium; *dry cupping* on the nape of the neck or between the shoulders; or *friction* with the following *liniment* along the spine, or the application of a piece of flannel moistened with it, on the sternum or epigastric region, according to the peculiarities and complications of the case: —

No. 258. ℞ Linimenti Camphoræ Comp., Linimenti Terebinthinæ, āā ℥ j.; Tinct. Capsici ʒ j.; Olei Caojuputi ʒ ss. vel ʒ j. Misce. Fiat Linimentum, vel Embrocatio.

66. Since the introduction of *vaccination*, it has been proposed by Okes, Cleeve, and Moutain, to inoculate with the vaccine matter as a preventive and as a cure of hooping-cough. This subject has been recently agitated, but without any conclusive evidence of benefit having been derived from the practice.

67. *k*. In the second, but especially in the third, stage of the disease, *change of air*, particularly to the sea-side, as recommended by Gregory and Hufeland, and *sea-voyaging*, are of the utmost advantage. For patients residing on the sea-coast, *frequent excursions* on the water will be highly beneficial, especially if nausea or vomiting be thereby produced. *Salt-water bathing*, commencing with the warm or tepid bath, and passing gradually to the cold bath or shower bath, will be found very serviceable, if no complication forbid it. The *diet* of the patient, in the first stage, should be antiphlogistic; and in the second and third it ought to be very light, chiefly farinaceous, and moderate in quantity. Over-distention of the stomach aggravates the fits, and favours cerebral congestions. Exposure to cold, or to vicissitudes of weather or temperature, running, &c., also, may induce inflammatory complications. Young children ought to be carefully watched at night, and be raised up as soon as the fit is threatened. Whenever the phlegm obstructs the fauces, it should be removed by a small thin piece of whalebone, bent in the form of a tongue-scraper, or by the finger of the nurse.

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HYDATID. — SYN. *Hydatis* (*ὑδατις*, a vesicle, from *ὕδωρ*, water). *Acephalocystis*, *Acéphalocyste* (from *α*, privative, *κεφαλὴ*, the head, and *κύστις*, a vesicle — a vesicle without a head), Laennec. *Vessie sans adhérence*, Cruveilhier. *Echino-*

coccus Hominis, Rudolphi and Bremser. *Polycephalus humanus*, *P. Echinococcus*, Zeder. *L'Echinocoque de l'Homme*, Lamarck. *Fischiosoma*, Brera. *Hydatide*, Fr. *Wasserblasse*, *Blasenwürm*, Germ. *Idatide*, Ital.

CLASSIF. — I. CLASS, V. ORDER (*Author*, in *Preface*).

1. DEFIN. — *Unattached vesicles, possessing a proper vitality, but dependent upon the parent body for the situations and conditions of existence.*

2. The term *Hydatid* has been very loosely employed by most writers, and even by many of the present day. It has been used by some as a generic appellation, not only for the several species of vesicular worms, or vesicles with one or more distinct heads, but also for the vesicular bodies now under consideration; and by others the name has been very improperly extended to those simple *cysts* which are produced from, and connected with, the surrounding tissues. In this article I shall consider only those vesicular bodies which do not possess distinct heads, but which present signs of a proper vitality, as constituting *true hydatids;* and shall refer the species, *Cystocercus*, *Polycephalus*, and *Ditrachyceros*, arranged by CLOQUET, KERR, and others, under this head, to that of *vesicular* WORMS. As to the species *Echinococcus*, described by RUDOLPHI, ZEDER, and others, I believe it, with BRERA and BREMSER, to be merely a variety of the *acephalocystis*. Simple *cysts*, or pseudo-hydatids, are altogether distinct formations from those under consideration; but I shall also briefly notice them. (See art. DISEASE, § 113—115.)

3. The name *Acéphalocyste* was applied by LAENNEC to an organic production, consisting of vesicles or spheroidal globules contained in a distinct cyst, which isolates them from the surrounding tissues, and with which they have no kind of connection. Although these productions scarcely merit to be elevated to the rank of a distinct species in animal existence, yet they must be considered, in pathology, to possess an individual vitality. They thus form one of the several species of *parasites*, to which the human frame often furnishes origin and nutrition, and which not infrequently destroy the parent body. (See PARASITICAL PRODUCTIONS.) When it is considered that they present nearly the same form and appearance, that they are unconnected with the surrounding tissues, differing only as to size; originating, without any determined cause, in the very substance of our organs; developing and multiplying themselves; and manifesting their existence only by the compression of adjoining structures, whence often result the most serious effects, and even death itself; it must be admitted that they deserve a due share of attention.

4. *Hydatids* were probably known to the ancients, although imperfectly; as HIPPOCRATES, CELSUS, GALEN, and ARETÆUS mention the existence of cysts in many of the states of disease in which they are met with in the present day; but no precise description of them was given until 1685, when HARTMANN directed attention to their animalcular nature. In 1691, Dr. TYSON published a paper (No. 193.) in *The Philosophical Transactions*, "to prove that hydatids, often met with in morbid animal bodies, are a species of worms or imperfect animals." Since that time, they have been particularly examined by PALLAS, LINNÆUS, MÜLLER, HUNTER, MONRO, GOEZE, BLOCH, LAMARCK, CUVIER, BRERA, RUDOLPHI, ZEDER, LAENNEC, BREMSER, CLOQUET, CRUVEILHIER, and others.

5. I. DESCRIPTION OF HYDATIDS, AND OF THE CYSTS CONTAINING THEM. — M. CRUVEILHIER remarks, that, if we represent to ourselves soap-bubbles of various sizes, the contained air being replaced by a fluid of perfect limpidity, the envelope formed by a film of coagulated white of egg, we shall have a very exact idea of acephalocystes. They vary in size from a millet seed to that of the largest orange; their form is spheroidal; and their specific gravity is nearly the same as water, although they generally sink when plunged in this fluid. When compressed, they resume their spherical form as soon as the pressure is removed. They are in general transparent and clear; sometimes only translucent; it is but rare that the fluid they contain is at all turbid. The various tints they present depend upon their envelopes, which have sometimes an opaline hue, either in particular points, or throughout their surface. Frequently semi-transparent flocculi are seen swimming in the liquid, and appear reticulated or plaited. M. CRUVEILHIER considers these as the débris of the internal pellicle of the hydatid, and the result of changes after death. Their external surface is generally smooth, uniform, and without crochets, or suctoria; and when their fluid is evacuated, they present neither heads nor mouths — *Hydatis lævis.* — If, therefore, they are to be considered as possessing individual animal existences, they are the simplest and lowest of animal creation. Examined with the microscope, the opaline appearance of their parietes proceeds sometimes from a thickening of the membranes forming them; at other times, from small whitish and hard granulations on their interior surfaces. They are without the smallest appearance of vessels of any kind.

6. When punctured, the contained fluid escapes in a jet tolerably strong and continued; the envelope, eminently elastic, contracts, and presents only about one third of its former capacity, and acquires double or treble its former thickness. Although transparent at first, it becomes semi-opaque, or opaline; and, although very extensible and elastic, it tears readily when it reaches the limits of extension. The fluid of an hydatid is not coagulated by heat, but it contains a little albumen and some salts, amongst which the chloride of sodium is predominant. The membrane, according to M. COLLARD, is composed of — *first*, an albuminiform substance, which, however, differs from albumen in being soluble in hydrochloric acid: *second*, of a substance analogous to mucus, but differing from mucus in its insolubility in alkalies; in its want of action on the acetate of lead; in its great solubility in the hydrochloric, sulphuric, and nitric acids, without the disengagement of gas; and in the circumstance of water restoring its physical and chemical properties after it has been dried. From these M. COLLARD infers, that the hydatidic parietes consist of a peculiar substance.

7. Anatomically, they are composed, according to M. CRUVEILHIER, of four or five membranes, or laminæ, of unequal thickness, each membrane also varying in thickness at different points; whence result their various degrees of opacity and trans-

parency. The small whitish granulations, already mentioned, are frequently found on the interior surface of the larger hydatids; but they are often wanting, especially in the smaller. They possess no regular form, but are elevated on the internal surface, carrying before them the internal pellicle. HIMLY says that some hydatids possess another internal membrane, which is remarkably thin, but presenting here and there, or in groups, corpuscles of a glandular appearance; and that these inclose hydatids of a minute size, thereby illustrating the system of the inclosure of germs. BREMSER has seen, in free hydatids, globules likewise unattached, in the interior of which still smaller globules existed; successive generations thus appearing in the same cyst. Dr. JOHN HUNTER and LAENNEC also consider the granulations or attached corpuscles to be young hydatids; and the numerous minute vesicles observed with the microscope diffused through the fluid contained in a hydatid, to be of the same nature. Dr. HUNTER remarks, that, in their growth and decay, they pass through various stages: they are at first found floating in the fluid that fills the hydatid, and afterwards attached to its coats. The hydatid, thus pregnant with young, adheres to the neighbouring parts, increases in size, and becomes itself a sac, containing numerous small hydatids. These, after a certain time, decay, and the skins or empty bags are squeezed together into a substance resembling isinglass; and it is probable that they undergo still further changes.

8. Besides these minute granulations on the interior surfaces, and still minuter vesicles detected in the contained fluid, and considered by M. CRUVEILHIER to be the débris of the internal pellicle, as described above (§ 5.), M. LAENNEC has remarked, in some instances, small germs or sprouts of an irregular form or size on the exterior surface. These he considers as nascent hydatids, which in a certain stage of growth are detached, and increase the number in the surrounding fluid. According to these writers, and to Dr. BARON and Sir A. COOPER, hydatids may be so produced as to form a number of concentric layers, resembling the crystalline lens, or the coats of an onion, with the fluid interposed between each layer. In such instances, it is to be presumed that the most internal is the last formed, and that the more external become condensed, and ultimately disrupted and altered by the developement of those in the centre.

9. M. CRUVEILHIER distinguishes hydatids into *two varieties*—the *solitary* and the *multiplied*—the *Acephalocystis eremita vel sterilis*, and the *A. socialis vel prolifera*. The first is most common in the lower animals, the second in man. The former rarely is confined to one situation, organ, or part, but invades several organs, or even a number of parts at the same time; the latter is as rarely produced in several parts of the same body, or even in different parts of the same organ.—*a*. The *solitary hydatid* is often found in thousands in the lungs, the liver, &c. of ruminants. M. CRUVEILHIER observed them at the same time in the lungs, the spleen, the kidneys, and the heart, of both sheep and oxen. The enveloping pellicle of the hydatid is altogether similar to that covering the interior of the cyst, but is without any kind of adhesion to it. This pellicle is semi-transparent, and presents a number of whitish points or granulations. The inclosing *cyst* is generally fibro-cartilaginous, and is not always spherical. Sometimes one or several partitions separate the cyst into as many cells, in each of which a hydatid is lodged, and exactly moulded. The tissue of the organs surrounding these cysts is quite unaltered.

10. *b*. The *multiplied hydatids* are always in greater or less numbers. From an hundred to a thousand may be contained in the same cyst or sac, varying from the size of a millet seed to that of the closed hand. They swim in a fluid presenting varying appearances. Sometimes this fluid is perfectly limpid; at others it is yellowish, especially in the hydatidic cysts formed in the liver; and it occasionally is puriform or purulent; yet, in this latter case, the hydatids themselves usually preserve their limpidity,—a circumstance, amongst others, proving their independent existence. When the fluid of the cyst, in which the hydatids are contained, is otherwise changed, and especially when it becomes more consistent, or presents characters materially different from the above, the hydatids are disrupted, broken down, emptied, and apparently dead.

11. *c*. The *cysts* which inclose either variety (the solitary or multiplied) of hydatids, is generally strong and composed of several laminæ, which separate easily, and present the characters of fibrous tissue. They frequently contain cartilaginous or ossific patches; and the thickness of their parietes is usually in proportion to their size and age. They are externally adherent to the surrounding tissues by loose cellular substance; but they are occasionally attached more firmly by a cellulo-fibrous structure. The organ in which they are situated is commonly unchanged; but when pressure is exerted by them, the surrounding parts are atrophied, or converted into a fibrous substance. The internal surface of the cysts is often rugose, and rarely polished or quite smooth. It has not the appearance of sero-fibrous surfaces, and yet it secretes the fluid in which the hydatids swim. It sometimes presents cracks or crevices, or solutions of continuity, from the distention caused by the growth of the hydatids, and increase of the fluid filling the cysts.

12. The hydatidic cysts are lined by a membrane, similar in all respects to that which constitutes the proper parietes of the contained hydatids, and presenting the same elasticity, fragility, colour, and physical and chemical properties. This membrane may be separated into several lamellæ. Its thickness is in proportion to its capacity. Its external surface nowhere adheres to the parietes of the cyst, and its internal surface is quite smooth. M. CRUVEILHIER considers it to be a large hydatid, enveloping and containing those which are smaller. It lines not only the cysts of the multiplied hydatids, but also those of the solitary. In the former, however, its internal surface is studded with minute granulations, some of which are isolated, and the others agglomerated. These granulations, as in the case of those observed in the interiors of the larger hydatids, are doubtless the germs of the free and smaller hydatids.

13. When a morbid action exists in the parietes of the sac, or cyst, or when they secrete pus instead of serum, then the enveloping acephalocyst is detached, and its débris are found mixed with the puriform secretion. The granulations or germs

are also altered, and the contained hydatids are often more or less changed. In such cases, the morbid secretion from the internal surface of the diseased cyst is destructive to the vitality, first of the enveloping or parent hydatid, and consecutively of those which it contains.

14. The vitality and independent existence of hydatids are shown not only by their reproductive powers, but also by the preservation of the animal substances composing them from the changes, or the decomposition, which these substances always undergo when they lose their organic connection with living parts. Yet, although thus possessing a certain, but a low, amount of vitality, they cannot be elevated to the rank of animals; for they possess neither sensibility nor mobility, although their parietes present signs of organic contractility. They may be viewed, therefore, as the lowest or incipient states of separate animal organisation, from which there is a gradual rise in the scale of existence, through the vesicular and flattened parasitic worms, up to the more perfect animals.

15. *d.* Hydatids undergo many *consecutive changes*, some of which originate in disease, either of their containing cysts, or of themselves. Occasionally these cysts break, either exteriorly or into a serous cavity, or upon a mucous surface; and this occurrence may be either fortunate or fatal, according to the situation in which it takes place. If the rupture occurs on a cutaneous or mucous surface, the admission of air causes prolonged suppuration. If it occurs in a serous cavity, which is rarely observed, fatal inflammation is thereby occasioned. Frequently, however, owing to the death of the hydatid, absorption of the fluid in the cyst takes place; the parietes contract, and approach towards the centre; and the remaining contents become remarkably changed, and often assume a tuberculous, putty-like, cheesy, or purulent form, the hydatidic membranes being pressed together, or otherwise altered. According to RUYSH, BREMSER, and others, hydatids may thus degenerate into atheromatous, steatomatous, or melicerous tumours, especially when they occur in the ovaria. This opinion has been zealously and ingeniously argued for by Dr. BARON. He supposes that the hydatid, or vesicular form, is that in which tuberculous, scirrhous, sarcomatous, steatomatous, and fungous productions originate; and that the transformation may take place at any period, or may not occur at all. The co-existence of hydatids with one or other of these formations has been urged in proof of this doctrine; but there has been no evidence of any of these having originated in hydatids, nor has the transition of the one morbid structure into the other been even partially demonstrated. The co-existence of these different productions in the same subject, that is sometimes observed, and that furnished the chief basis of this doctrine, is merely a coincidence arising out of a fully ascertained circumstance,— that the same states of constitution, of vital activity, and vascular action, which favour the production of the one structure, also predispose to the other.

16. II.—PSEUDO-HYDATIDS, SIMPLE CYSTS, or *vesicles*, have been very commonly confounded with true hydatids. From this circumstance it will be necessary to take some further notice of them at this place, than has been taken in the article DISEASE (§ 113—115.). They are found either entirely or partially in contact with the adjacent tissues, are supplied by these with the fluid they contain, and are nourished by them. Dr. KERR has divided them into two varieties, viz. those which consist of *simple cysts*, or bladders capable of being detached without lesion of structure, and those which are *compound*, and which appear as diverticula from the subjacent membranous expansions, from which a separation at their bases cannot take place without laceration of a part essential to the integrity of one or the other.— *A.* Under the *former head* may be arranged—1st, those cysts met with under the common integuments, that contain a sebaceous, atheromatous, or meliceritious substance, secreted by the cyst, and causing its distention;—2dly, those cysts formed by complete obstruction of a canal conveying secreted fluids, as ranula, those found in the labial glands, and the surface of the kidneys, &c.;—3dly, those proceeding from the distention of cells naturally existing in organs, by a morbidly increased and altered secretion; as in ovarian dropsy, and disease of the thyroid gland;—and, 4thly, those serous cysts often found in the plexus choroides, sometimes in the eyelids, more rarely in the lungs, the female mamma, and other parts of the body. These last sometimes acquire a large size, especially when seated near the surface of any of the abdominal or thoracic viscera, and constitute encysted dropsy. The cysts belonging to this class are generally simple, distinct, and solitary. When two or more of them are developed in one part, as in the plexus choroides, the association is owing to the same cause which produced the one, having likewise operated in its neighbourhood. This has been well shown by Dr. HODGKIN. (*Med. Chirurg. Trans.* vol. xv. p. 266.).

17. The *formation* of this species of cysts, especially of those which cannot be referred to the obstruction of canals or orifices of ducts, has been a subject of much speculation. It has been supposed by some, that they are produced by the obstruction and consequent dilatation of absorbents, or of other vessels not admitting the passage of red blood. This, however, is only a supposition. In a paper which I published in 1821 (*Lond. Med. Repos.* vol. xv. p. 378.), I suggested their origin in effusion into one or more cells of the areolar tissue, the state of the effused or secreted fluid, and the changes in the tissue immediately surrounding and confining the fluid, preventing the diffusion of the secretion in the adjoining parts, and giving origin to the parietes of the cyst. If serum accumulates in one or more of these cells, owing either to morbidly excited action, or to impaired absorption, in connection with an impermeable state of the surrounding tissue, this latter will be impacted around the collected fluid, and the albuminous portion of this fluid will attach itself to and line the sides of the cavity thus formed. As the effusion increases, this cavity will enlarge; the parietes formed by the impacted areolar tissue will become firmer and denser; the albuminous portion of the secretion will continue to attach itself to the parietes, if it be in small quantity, where it will become organised, or even converted into a serous surface; and the cyst will present several coats or laminæ, thus produced from the condensed surrounding tissue, and from the successive depositions of albuminous pellicles on its internal surface from the secreted

fluid. At the same time, it is not improbable, that many of the simple cysts are actually formed before the fluid they contain, as supposed by BICHAT, and as admitted by me, in the article DISEASE (§ 115.). The fluid in the cyst, particularly when it is thick, or more remarkably albuminous, or muco-albuminous, may undergo various changes, arising either from its properties at the time of its secretion, or from the states of local and general action and of constitutional or vital power. These changes may also be further aided by partial absorption of its watery parts, or by the tendency of its chemical elements to form new combinations, when removed to a certain extent beyond the vital influence, and still subjected to an elevated temperature. To these circumstances may be attributed most of the appearances observed in the contents, as well as in the tunics, of the class of *simple cysts*, and described in the article DISEASE (§ 113—115.), whether the cysts are first developed as a serous membrane, or are formed by the fluid effused into the areolar tissue.

18. *B.* The *compound variety* of cysts (§ 16.) are those whose parietes possess the property of producing other cysts of a similar character to themselves, or, as Dr. HODGKIN has shown, other morbid growths, which, if they do not present, strictly speaking, the character of cysts, are nevertheless referrible to the same type or mode of formation. Cysts of this kind, like simple cysts, are found in different parts of the body, but are by far most frequently seen, acquire the largest size, and present the greatest variety of appearances, in connection with the female organs of generation. In this variety, elevations more or less rounded, and of various sizes, are observed projecting on the interior surface of the principal cyst, and are covered by a membrane continuous with that lining the interior of this cyst. Dr. HODGKIN remarks, that on making an incision into these projecting elevations, they are found to be cysts of a secondary order, filled by a secretion, often serous, but almost as frequently mucous. On an intimate inspection of those secondary cysts, the germs of other or tertiary cysts are also found projecting from their interior surfaces, upon which is reflected the lining membrane of the cyst in which they are contained. Secondary cysts sometimes afford as complete specimens of a reflected serous membrane, as either the pericardium or the tunica vaginalis; the lining membrane of the containing cyst corresponding to the reflected portion, as that covering the contained bunch of cysts does to the close portion. The proportion which the contained cysts bear to the cavity of the membrane reflected over them, is extremely various. Sometimes the fluid, especially when it is serous, nearly fills the containing cyst, whilst the bunch of secondary cysts is of very inconsiderable size. At other times, the principal cyst is almost entirely filled by those of the inferior order; in which case the nodulous or tuberose elevations found on the exterior of the former, are occasioned by the unequal developement of the latter. It may even happen, that the distention, caused by the growth of the contained cysts, is sufficient to produce a rupture of the containing cyst, which admits both of the escape of its fluid contents, and of the unrepressed growth of the secondary or tertiary cysts, which took their origin from its internal surface. As the inferior cysts themselves are found to contain, as Dr. HODGKIN has shown, a serous or mucous secretion, and very often to produce another order of cysts, possessing the same character with themselves, it is by no means surprising that these different orders of cysts, which sometimes have the appearance of delicate and pellucid vesicles, filled with clear and colourless serum, and possessed of the power of giving rise to a multitude of vesicles or cysts presenting the same character with themselves, should have been mistaken for true hydatids. But a little careful inspection would have shown that the bunches or clusters of secondary cysts are invariably attached to and continuous with the internal surface of the primary or containing cyst; and that delicate vessels ramify from the one upon the other.

19. It is reasonable to infer, that these compound cysts will present diversified appearances, and give rise to various changes, according to their duration, to the state of vascular action in the parts in which they are formed, and to the constitutional or vital power of the patient; and that, according to the alterations which may take place in these cysts and in their contained fluids, adventitious formations of various kinds, and even scirrhous and carcinomatous structures, may be ultimately developed. — My limits will not permit me to describe the various appearances which these compound cysts may present, in different situations, and at different epochs of developement, or to trace the various changes they undergo, and far less to speculate upon their transformations into malignant or other structures. I must, therefore, refer the reader to Dr. HODGKIN's ingenious and able paper on this subject.

20. III. TRUE HYDATIDS have been found in almost every organ or structure of the human body. Instead, however, of considering them at this place with reference to *their seats* in the brain, in the lungs, in the heart, in the liver, in the kidneys, &c. &c., I have, conformably with the plan of this work, noticed their occurrence in these organs, in the articles devoted to the pathology of the several viscera. In these articles, as well as in some others, the *symptoms* they occasion, and the *treatment* they require, in their various *localities*, are more fully and sufficiently discussed: I here confine myself to a general view of these subjects.

21. IV. REMOTE AND IMMEDIATE CAUSES. — *a.* Attention to the circumstances in which hydatids present themselves in man and in the lower animals proves, that they generally originate in whatever impairs vascular activity and vital power; and, of the causes which produce this effect, none are more influential than unwholesome and insufficient food, living too exclusively on vegetable diet, and residence in humid, cold, and low situations. Indeed, in the lower animals, they may be produced at will by insufficient nourishment, by humidity, and by food consisting chiefly of green succulent vegetables. Conjoined with these, debility arising from previous disease, convalescence from febrile or epidemic maladies, and the depressing passions, exert more or less power. There is reason also to infer that local injury, as well as local debility, has some share in determining the seat of these parasitic productions.

22. *b.* Various attempts have been made to account for their *origin*. BIDLOO believed them to arise from the dilatation of lymphatic vessels; the

valves forming a limit to the vesicles. M. Andral has recently attributed their origin to a deposit of a fibrinous clot in the areolar or other tissues. He supposes that a minute fibrinous concretion, secreted by blood-vessels in a state of morbid action, assumes an incipient form of organisation, and that hydatids are an advanced grade of such organisation. This supposition is supported by the well known fact that fibrinous concretions formed on serous surfaces, although at first amorphous, ultimately become organised. As the origin of true hydatids is susceptible of the same explanation as that of the *Vesicular and other Parasitic* Worms, the reader is referred to what is advanced on this subject in the article Worms.

23. V. Symptoms.—The formation of hydatids being attended by no appreciable lesion of function or of vascular action, the general symptoms are most uncertain, if, indeed, they be not entirely unascertained, especially in the early stages of this malady. Hydatids are developed so slowly and so entirely without vascular determination and excited action, that the organs in which they are seated adapt themselves to the pressure or slight displacement of parts they may occasion. When, however, they are seated within the cranium, or when their bulk in other situations becomes great, then the disorder they may occasion is made more manifest; although, even then, the constitution may not sympathise very remarkably with the local alteration. It very frequently happens, that no idea has been entertained of the existence of these productions, in persons who have laboured long under slight ailments, until detected accidentally in a *post mortem* inspection. It is only when the hydatidic cyst has acquired a volume so considerable, as to give rise to a palpable or visible tumour, that we can suspect its nature. In such cases, the suspicion is rendered more probable, when some degree of fluctuation, attended with a tremulous sensation, is perceived. This symptom, however, is illusory; for it attends other deep-seated collections of fluid. When, owing to the death of the hydatids, or to inflammatory irritation, or rupture of the containing cyst, suppuration affects this latter, then hectic fever, discolouration of the general surface, emaciation, and other attendants of organic lesion, take place. It sometimes happens that inflammation extends from the cyst to the adjoining parts, and that the morbid production thus makes its way either to the surface of the body, or into some internal cavity or canal. When it opens exteriorly, the nature of the malady then becomes manifest, and the recovery of the patient even possible.

24. VI. Treatment.—Our imperfect knowledge of the causes and symptoms of hydatids necessarily renders the prevention and cure of them also very imperfect. Such of the causes as seem to be more fully ascertained, should be avoided, and those general principles of treatment, found to be most successful when the human body is the seat of parasitic productions, should be adopted. I have shown, in the article Worms, that the chief principle of cure, next to the discharge of the parasitic animals, is to impart tone and vigour to the constitution, so as to enable it to resist their reproduction or increase, and to throw them off with the secretions and excretions, when a more immediate and direct removal of them cannot be effected. We may consider as axioms in pathology and therapeutics, that parasites form, multiply, and increase, in proportion as the parent becomes weakened, and as the secretions and excretions accumulate, or are retained; and that they diminish, and ultimately disappear, with the full restoration of the vital power, and of the secreting and excreting functions of the animal which produced them. The practical application of these axioms to hydatids is very manifest. The principle being admitted, the selection of individual means will depend upon the seat of these productions, and upon the peculiarities of individual cases. In most instances, however, the preparations of iron, those of iodine, the iodide of iron, chalybeate mineral waters, camphor; and the balsams, the various vegetable and mineral tonics, and the promotion of the secretions and excretions, by a combination of mild purgatives with stomachics and bitters, will be appropriate.

25. With respect to the propriety of *puncturing* the hydatidic cyst, in circumstances appearing to require this measure, much will depend upon its seat, with respect to the external surface, to serous membranes, and to internal canals. For, where this operation is likely to risk effusion into an adjoining serous cavity, as into the peritoneum, or to induce inflammation of a serous membrane, it ought not to be attempted. When the cyst is seated near, or has reached, the exterior surface; when inflammation and adhesion have obliterated any cavity intervening between it and the exterior; and when the integuments have become inflamed and acuminated, so as to point out the situation where only a puncture should be made, then it may be undertaken. As to the other points of treatment, they will come under consideration in the places where hydatids, seated in the internal viscera, are discussed.

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HYPERTROPHY.—Syn. *Hypertrophia*, (from ὑπερ, above, and τροφὴ, nutrition,) *excessive nutrition*. *Hypertrophie*, Fr. *Die Uebernährung*, Germ. *Enlargement of a tissue or organ from excessive nutrition.*

Classif. — General Pathology. *Morbid Structures, General Therapeutics.*

1. *Hypertrophy* is a term introduced by French pathologists to signify excessive nutrition of a tissue or organ, and often very loosely employed by them, and by some recent English writers, whose imitation of the former has been more close than judicious. According to the derivation and definition of the word, hypertrophy should be applied only to an increase of nutrition of a tissue beyond what is natural, and not to the augmented bulk arising from adventitious depositions in areolar or other structures. To this latter, however, it has been frequenly applied by some recent authors. M. Cruveilhier has suggested a division of hypertrophy into the *physiological* and *pathological*; but the one variety frequently passes into the other, or the only difference between the two may be that of locality. All the pathological facts, he adds, relative to hypertrophy, may be referred to the three following heads: *first, simple and pure hypertrophy*; *secondly, hypertrophy with induration*; and *thirdly, hypertrophy with transformation.* But, as M. Andral justly remarks, the term hypertrophy should be applied exclusively to those cases in which the tissue, whose volume is increased, retains its natural structure and organisation. Hypertrophy, thus restricted, may exist in any one of the various elementary tissues, or even contemporaneously in two or more of them. It may also occur in organs formed by the combination of several of these tissues, and there affect only one, or extend itself to two or more. In either of these states, hypertrophy may be considered as a simple lesion, although it may be attended by increased firmness and density, which are generally observed to exist in hypertrophied tissues. It more frequently, however, occurs in complicated states, or associated with some transformation of, or deposition in, collatitious or adjoining textures. In such cases it is difficult to determine whether the hypertrophy, or its associated alteration, is the primary lesion, or how far the one may be dependent upon the other. In many instances of hypertrophy of one tissue, the collatitious tissues are more or less atrophied; in this case the sequence and dependence of change are manifest. From these considerations, hypertrophy may be divided into, 1st, the *simple*, and, 2dly, the *associated* or *complicated*; the latter, however, being so diversified as to preclude a description sufficiently brief and consistent for this article. The subject, however, under both these heads is sufficiently discussed in the articles devoted to the pathological anatomy of the individual tissues and organs.

2. I. Nature of Hypertrophy.—When this change occurs simply, without any associated alteration, it can be referred only to an excess of nutritive function; and an active state of the circulation, dependent upon increased nervous power, may be considered as the conditions requisite to this ex-

cessive state of nutrition. This fact is proved by the physiological consideration of the subject, especially by those employments in which particular muscles are principally exercised and consequently developed. In these instances, volition determines a more frequent and energetic contraction of certain muscles, and such contractions require an increased supply of blood: whence, ultimately, results augmented developement. What is familiarly demonstrated in the voluntary muscles also takes place in the involuntary, under analogous circumstances; thus, the constant or repeated efforts made by the ventricles of the heart, by the parietes of the stomach, by the urinary bladder, or even by the intestinal canal, to overcome an obstacle placed at their outlets, or to procure a free passage for their contents, are followed by excessive developement of their muscular structures, and are attended by a relative increase of their vascularity. In these instances, the first change in the hypertrophied part is manifestly excited or increased organic nervous influence. This determines not only excessive muscular contraction, but also augmented vascular determination, and, as the general result, superabundant nutrition. On this point, the opinion of Dr. Carswell, who has written with more precision on this subject than any of his contemporaries, does not materially differ from my own. He fully admits that an increased supply of blood is necessary to hypertrophy, but has left out of consideration the share which the nervous power has in the production both of this increase, and of the excessive nutrition which follows. He justly remarks, that the nature of hypertrophy merits due consideration, as involving the principle on which the treatment of it should be founded, and as establishing a law directly opposed to the doctrine that this lesion is the primary element of certain adventitious structures. M. Andral has proposed this doctrine, and has contended, that hypertrophy of the cellular tissue forms a necessary condition in the production of scirrhus and carcinoma. But, although the cellular tissue may be more or less hypertrophied in these maladies, this alteration is associated with others less physiological, and infinitely more morbid than it, in their vital and organic relations.

3. II. Causes and Origin.—Hypertrophy, in some of its forms, or with reference to certain tissues, may depend upon a predisposition existing in the organisation. Some persons have an hereditary predisposition to an excessive developement of the adipose tissue; obesity occurring in these, however abstemious they may be. Others present also an hereditary predisposition to enlargement of the bones, or of the lymphatic, or other glands. The common *exciting causes* of hypertrophy are,—*first*, the increased action of a tissue or organ; *secondly*, the prolonged influence of an irritant or stimulus. Either of these classes of causes may induce hypertrophy, in its *simple* or *complicated* forms.

4. *A. Increased action or function* of a part gives rise most frequently to hypertrophy in its *simple form*. It then may be considered as purely *physiological;* thus, the blacksmith has the muscles of his arms powerfully developed, and the opera-dancer, those of his lower extremities. The hypertrophy in such cases is frequently attended by an atrophy of other muscles, not brought into action. The drayman, or coalheaver, has the muscles of the arms and trunk strongly formed, whilst those of the legs are imperfectly developed, their action being confined, or entirely suppressed, by the thick-soled shoes they are accustomed to wear, and by their shuffling gait. Increased function, or action of the heart, is often followed by excessive nutrition, even independently of lesion of the orifices and valves. Obliteration of an arterial, or venous trunk, causes enlargement of the collateral vessels. Destruction of one kidney, or of one lung, gives rise to marked augmentation of the size of the other. Obstacles to the evacuation of the contents of the hollow viscera occasion hypertrophy of the parietes of these viscera, owing to the increased action required to overcome these obstacles; but the increased action in such cases operates similarly to that produced by excited function, in the circumstances just adverted to.

5. *B. The protracted operation of a morbid stimulus, or irritant*, is the most common cause of these forms of hypertrophy, which may be denominated *pathological*, and which are most frequently *complicated*. These forms were arranged by Dupuytren under the denomination of *nutritive irritations*. They are not always instances of pure hypertrophy; but, as they often result from a state of chronic inflammation, so they are attended with, and even partially dependent upon, a deposition of coagulable lymph, which has become more or less organised and identified with the tissues in the areolæ of which it has been effused. There is every reason to believe, that many of the cases of hypertrophy said to have been observed in the cellular, serous, mucous, and glandular structures, either singly or complicated with other lesions, were actually referrible to this category. Indeed, it is by no means easy to distinguish the enlargement caused by the effusion of lymph, which has become thus organised from pure hypertrophy, particularly as respects the tissues just enumerated, and when other organic lesions are also present in the affected part. That, however, hypertrophy actually takes place from prolonged irritation, is proved by the changes produced by this cause in the integuments, the mucous, and serous surfaces, the cellular tissue, &c. Most of the forms of associated or complicated hypertrophy, noticed in the articles on the pathological anatomy of the different tissues and organs, are referrible to causes which fall under this head.

6. III. Characters.—*a.* Increase of *bulk* is not always characteristic of hypertrophy; for hollow viscera, as the heart, stomach, urinary bladder, &c., may have their parietes very much thickened, without their dimensions being externally augmented. Hypertrophy may exist even although the apparent bulk of the organ is diminished. In such instances the thickness of the parietes must be considered with reference to the external dimensions and internal capacity of the organ.—*b.* The *form* also of a tissue or part will also be changed or modified in some degree, but chiefly when the hypertrophy is circumscribed. This is demonstrated most remarkably in cases of hypertrophy of the bones, skin, mucous tissues, &c. — *c.* The *consistence* of the hypertrophied part is generally somewhat altered. It is most commonly more or less increased, particularly in the cellular tissue,

lymphatic glands, brain, skin, &c. Diminished consistence is never met with, excepting in some rare instances of complicated hypertrophy, when the enlarged tissue has experienced consecutive change.— *d.* As increased size, and generally also augmented density, or firmness of the hypertrophied tissue, obtain, it must necessarily follow that the *weight* of the part is also greater.—*e.* The *colour* is increased, unless the blood-vessels are compressed by the enlarged structure; as sometimes observed in the brain, in the bones, and cellular tissue.

7. IV. The Effects of hypertrophy are — 1. Increased action relatively to the augmentation of size, as in hypertrophy of the heart, of the urinary bladder, &c. 2. Compression and atrophy of the collatitious textures, particularly when one or more of the tissues of an organ or part is enlarged. 3. Diminution of a cavity, or of the canal of an organ, as in concentric hypertrophy of the ventricles, and in some instances of hypertrophy of the urinary bladder, or of portions of the digestive tube. 4. Compression of adjoining organs, when a viscus is greatly enlarged; and, 5. Augmented developement of the vascular system of the hypertrophied part.

8. V. The General Treatment of hypertrophy may be conducted with the following *intentions:* — 1. The removal of the exciting and pathological causes, when this can be attempted. 2. The diminution of the quantity and richness of the blood, by depletions and low diet, as far as may be consistent with the circumstances of particular cases, and localities of this lesion. 3. The prevention of local determination of blood, particularly to the hypertrophied organ or part, and the derivation of it to other situations. 4. The avoidance of local and general excitement, and the procuring, as much as possible, the repose of the affected organ. All these intentions are not equally applicable to every case, and some of them should be entertained with caution in certain circumstances. Thus, when hypertrophy depends upon repeated efforts to evacuate fully an organ, the second indication ought to be either very cautiously or very partially fulfilled. The particular means or remedies which may be selected to accomplish these intentions should depend entirely upon the seat of the lesion, and the peculiarities of individual cases; they are fully noticed in the places where the particular forms of hypertrophy are discussed.

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HYPOCHONDRIASIS. — Syn. Ὑποχονδριον, the Hypochondre; ὑποχονδριακος, adj. (from ὑπὸ, under, and χονδρος, cartilage.) *Hypochondria*, Auct. Lat. *Morbus Flatuosus*, Diocles and Aëtius. *Malum Hypochondriacum*, Galen, Hoffmann. *Morbus Hypochondriacus*, Fracastori. *Morbus Resiccatorius; Morbus Ructuosus; Passio* vel *Affectio*, vel *Melancholia, Hypochondriaca*, Auct. var. *Mater Scorbuti*, de Barbette. *Hypochondriasis*, Sauvages, Linnæus, Cullen. *Hallucinatio Hypochondriasis*, Crichton. *Alusio Hypochondriasis*, Good. *Dyspepsia Hypochondriasis*, Young; *Hypochondrie Maladie Imaginaire*, Fr. *Die Hypochondrie, Grillenkrankheit*, Germ. *Ipochrondia*, Ital. *Neuropathy*, I. M. Gully. *Hypochondrism, Hyp. Vapours, Hypochondriasis, Low Spirits, Hypochondriac Passion, Nervousness.*

Classif. — 2. *Class*, Nervous Diseases; 2.
Order, from want of vital power (*Cullen*).
4. *Class*, Diseases of the Nervous Function;
1. *Order*, Affecting the Intellect (*Good*).
I. Class, IV. Order (*Author*, in *Preface*).

1. Defin.—*Chronic indigestion with langour, flatulency, dejection of mind and fear, arising from inadequate causes; general exaltation of sensibility; a rapid succession of morbid phenomena, simulating numerous diseases, or otherwise a real, but variable state of suffering, exaggerated by the morbid sensibility and fears of the patient, with unsteadiness or variability of purpose, and distressing anxiety respecting his complaints.*

2. *Hypochondriasis* has been very differently arranged by nosological writers. Vogel placed it amongst spasmodic diseases, and Cullen, much more correctly, in that order of nervous complaints which depend upon defective vital power. Sauvages, Linnæus, Pinel, and Good have included it in the class of mental affections, and viewed it as nearly allied to insanity. I agree with Dr. Prichard in considering the arrangement of these latter writers not to be justified by the history of the disease, and for reasons that will be stated under the head of *Diagnosis.*

3. I. Description and History. — *A.* The *first*, or *slightest degree*, or *stage* of this malady, is generally confined to disorder of the digestive organs; its invasion and progress being commonly slow. However, in a very few instances, its attack is sudden, and its course more rapid. The disorder of the digestive organs is always real, although more or less exaggerated, and attended by a sentiment of general uneasiness or distress, referrible to an increased susceptibility, or morbid sensibility, especially of the organic nervous system. The appetite is sometimes not affected, but it is occasionally variable or deficient, or even excessive. Digestion is slow and difficult, and the patient complains of pain, oppression, or distention in the stomach, or hypochondres after a meal. These sensations are attended and aggravated by flatulency, and borborygmi, and sometimes by acid or acrid eructations. Occasionally the abdomen feels hard from flatulent distension, and various symptoms characteristic of chronic indigestion, as cardialgia, sense of heat in the course of the œsophagus, nausea, hemicrania, twisting or griping pains in the abdomen, &c., are complained of. In a few instances, the appetite is perverted, particularly in hypochondriacal females, or during pregnancy, a morbid desire for indigestible or the most improper substances being present. Thirst is seldom much complained of. The tongue is commonly loaded or covered, towards the root and middle especially, and particularly before breakfast, with a mucous coating. The mouth is clammy, and the taste somewhat perverted. The breath is generally offensive. The nausea is sometimes attended with a vomiting of mucous fluid, or of an acid

matter, with half digested food, and sometimes with a sort of salivation. The flatulence of the digestive canal excites, or is accompanied by, sympathetic pains in various situations, which are alleviated by eructations, and especially by the expulsion of the air downwards, but these pains usually return, although not always in the same place, or with the same characters. The bowels are generally costive, but they are occasionally irregular; constipation, with colicky pains, sometimes alternating with diarrhœa. The relaxation of the bowels seldom affords relief; and when it is prolonged, it often increases the anxiety, depression, and nervousness of the patient. The urine is occasionally natural, but it has frequently been observed by **Sydenham**, **Hoffmann**, and **Cheyne**, more than usually limpid and abundant. It is sometimes loaded, or deposits a copious sediment, as in dyspeptic cases. Palpitations in the heart, and in the epigastric region, are sometimes felt, and excite great uneasiness in the patient's mind.

4. *B.* The *second degree*, or *stage* of the complaint, is even still more diversified than the preceding. The symptoms already detailed continue undiminished, are often aggravated, and are accompanied by others, referrible to the brain and organs of sense, and sometimes also to the thoracic viscera. Yet, notwithstanding the severe train of symptoms, and distressing feelings of the patient, he frequently presents the appearance of sound, or even robust health. He often complains of violent pains in the temples, forehead, or occiput, or of general headache, with dimness of sight, and noises in the ears; or of a sense of weight or pressure, more intolerable than pain, at the vertex, with giddiness or confusion of mind; and sometimes of a constriction, or tightness in the head or temples, or of a morbid sensibility of the scalp, and roots of the hair. Occasionally the senses are morbidly acute and intolerant of light and noise. Pains resembling rheumatism, or those of syphilis, are felt in various situations, occasionally with a feeling of burning or heat, and sometimes with coldness, horripilations, numbness, cramps, feebleness, or threatened paralysis of one or other of the extremities. Weakness of the limbs, unsteadiness in walking, or feebleness of the joints, (in some instances, with neuralgic pains,) and great susceptibility to cold and heat, are not unfrequently also complained of. The morbid sensibility of the hypochondriac is generally increased by a cold and humid state of the atmosphere, by easterly winds, and by very warm seasons. His mind is incapable of exertion or prolonged attention, although, when aroused, he may be lively and acute; but he soon becomes engaged with his own feelings and sufferings. To these he frequently recurs in conversation, whenever he has an opportunity of doing so, although he seems to suspect that the subject is unpleasant to those who listen to him, and therefore suppresses a part of his complainings. In some cases there is dyspnœa, constriction of the chest, with a dry, short, or spasmodic cough, and occasionally a sense of suffocation or constriction is felt in the throat, with flatulence and various other symptoms resembling those attendant on hysteria. These phenomena have induced several writers to consider the disease closely allied to hysteria, and the severe palpitations, or irregular action of the heart, frequently also complained of, have further countenanced the idea; whilst they have excited the anxiety of the patient, and induced him to believe himself the subject of irremediable disease of the heart. Sleep is sometimes not materially disturbed, and occasionally the hour of repose is ardently looked for; but, in other cases, it is dreaded as aggravating the distress. Generally, as the disease advances, unquiet and distressing dreams, restlessness or insomnia, incubus and nervous agitations, are more or less complained of.

5. *C.* The *third or confirmed grade* of this malady presents nearly the same phenomena as have been detailed, but in a somewhat heightened and chronic form. The complaints of the patient have been varied, and a succession of most of those enumerated has been experienced. The patient is often tortured with the most distressing feelings, which are greatly aggravated by his fears. He dreads impending dissolution, from the symptoms referred to the head, heart, or chest. His ideas are concentrated on himself and his feelings, and he is incapable of attention or mental exertion, unless aroused by circumstances of unusual interest or moment. This mental incapacity is increased by an idea that his faculties are impaired, and by his dread to exert them. Occasionally vertigo, dimness of vision, or intolerance of light and noise, are so great as to justify his fears; and the pains in the head, or the sensations of pressure on the head and temples, are so severe, that the eyes feel as if starting from their sockets. At the same time, the organic sensibility of the digestive canal is so acute, that the progress and operation of a dose of medicine are traced by him through the different compartments, and made objects of comment. Palpitation is felt at the epigastrium, and about the cœliac axis, and is sometimes attended with sensations of throbbing, extending to the extremities. Disorder of the digestive functions still continues more or less marked, and the tongue is either loaded, or covered with a mucous coating, or is flabby at its edges. The pulse is seldom very materially affected, unless the patient be subject to palpitations, or irregular action of the heart. In this advanced, or prolonged state of the disease, the countenance of the patient often presents an air of distress or suffering. In some cases, it becomes sallow; but, in others, his appearance has no relation to the intensity of the sufferings he expresses. Whilst most of the faculties of the mind are more or less weakened, the imagination is morbidly active, and is constantly engaged with the consequences or results of the disease, of which he believes himself the subject. His desire and hopes of recovery, however, prevent him from being weary of life, or from entertaining an idea of terminating it. On the contrary, he is most anxious to obtain relief; but is frequently unsteady in the use of means calculated to afford it. He has recourse to a variety of opinions; and is more ready to adopt what is recommended for his restoration, than to persevere in its employment, or to continue under the direction of the physician whom he has consulted.

6. II. **Associations or Complications.** — Judicious observers, who have studied the course of this malady, will agree in believing, that the symptoms characterising it are by no means imaginary. They evidently depend upon physi-

cal disease, in connection with a morbidly exalted state of sensibility. This physical disease commences in the digestive organs, attended with morbid organic sensibility, which extends to the cerebro-spinal nervous system, thereby aggravating and multiplying the morbid phenomena. The lesions, therefore, observed in the course of the malady, whether functional or structural, can hardly be denominated complications. They are rather integral or necessary parts of the malady, rendered more prominent, however, by the distressing feelings which they excite, or with which they are associated. In addition to the functional disorder of the *stomach*, and other chylopoietic viscera, characterising this complaint, the digestive canal often presents evidence of marked irritation, amounting, in some cases, to asthenic inflammatory action, or even to structural lesion of the mucous surface. The secreting function of the *liver* is also often disordered, and symptoms of congestion or engorgement of this organ, or even of inflammatory action, may occasionally be detected; and in these affections, the *gall-bladder* and *ducts* not unfrequently participate. The *spleen* is sometimes enlarged, and occasionally in connection with disorder in the biliary apparatus. Hypochondriacs often are subject to *hæmorrhoids*, owing to local or general plethora, or to costiveness, or to the use of irritating cathartics. This connection has been noticed by HIPPOCRATES, GALEN, STAHL, HOFFMANN, ALBERTI, HIGHMORE, and others, and has been considered as being salutary in plethoric hypochondriacs, and when the hæmorrhoidal flux has not been excessive or debilitating. Some writers, particularly KOCH and BÜCHNER, have viewed the hæmorrhoids as the cause of the hypochondriasis; and I have met with cases which countenance the opinion, as well as with others which militate against it, and show that the removal of the former has increased the latter, by augmenting plethora, and disposing to affections of the brain. I was very recently consulted by a gentleman, who had been subject to hæmorrhoids and hypochondriasis, in its slighter form, the discharge from the former always relieving the latter for a time. The hæmorrhoidal affection was cured by surgical treatment; but the hypochondriasis was afterwards remarkably aggravated, and was followed by painful spasm and irritation about the sphincter. He consulted another eminent surgeon, who divided the sphincter; but the operation was succeeded by inflammation of the rectum, extending along the colon, with the usual dysenteric symptoms, fever, and the utmost distress. These having been subdued, the complaint in the rectum continued unmitigated; and the patient's hypochondriacal sufferings increased to the utmost. In this case, the local treatment, which was obviously injudicious, remarkably aggravated the disease.

7. Hypochondriasis either seldom occurs in FEMALES, or occurs only in a slight degree, as long as the catamenia continue regular; but when they are suppressed or diminished, or disappear at the natural period, it occasionally commences, or is aggravated. It may also occur in a slight form during *pregnancy*, and subside or disappear after delivery. Of this I have seen more than one instance. Pregnancy may also relieve this complaint, when the patient has been labouring under it for some time previously. *Organic disease*, or *irritation* of the *uterus*, is one of the most frequent associations of hypochondriasis in this class of patients; and it may, moreover, not be the only one in the same case.

8. The symptoms referrible to the *head* are not always dependent alone upon altered or exalted sensibility. In addition to this state, there is often also congestion, or deranged circulation in the brain; but the cerebral affection is generally consecutive upon disorder of the digestive functions, and upon increased sensibility of the organic or ganglial nervous system, even although the chief cause of the hypochondriasis has acted primarily upon the mind.

9. Hypochondriasis may be excited in the course of some organic malady, by the patient's attention being suddenly directed to the seat of disease, although his feelings and spirits had not been previously affected. This is not unusually the case with *organic affections* of the *heart*. I have seen more than one instance, where the detection of disease about the valves, or a particular examination of the heart by auscultation and percussion, led the patient to suspect what really existed; and the suspicion soon amounted in his mind to certainty, — his fears and distresses becoming even painful to the observer. The connection of hypochondriasis with the *gouty diathesis* has seldom been adverted to by writers. Yet I have met with several cases where the former has come on after the suppression or disappearance of gout. In such cases, disorder of the abdominal viscera is more or less marked; and is sometimes associated with deranged circulation in the brain. Indeed, this may be said to be one of the forms of misplaced gout: hypochondriasis, when prolonged or neglected, or aggravated by injudicious treatment, may pass into *melancholy*, or even into *insanity*; but this is much more rare than is supposed. In these instances, melancholic ideas, or some single delusion, is entertained, whilst the primary disorder either continues unchanged, or is partially absorbed in the superinduced malady.

10. III. DURATION AND TERMINATIONS. — *a*. The *duration* and *progress* of hypochondriasis are most indefinite. The accession of it is generally gradual and imperceptible, unless when caused by some overpowering impression or mental emotion. When judiciously treated, in its slighter forms, or during early periods, this complaint may be removed after a comparatively short time; but, otherwise, it may continue for years, with various mutations, and with indefinite periods of relief or exacerbation, depending partly upon the permanence of the causes, on the state of the season, or the occupations and amusements of the patient, or upon whatever may affect his general health and constitutional powers. It may even spontaneously cease for a time, and return again and again; or it may continue through life, without apparently shortening its duration: but, more frequently, the functional, or structural, lesion producing it gradually increases, until visceral disease of a very obvious kind is developed, and shortens existence, under the care of some practitioner who, most probably, had not witnessed the earlier progress of the malady.

11. *b*. The *terminations* of hypochondriasis are —1st, in the restoration of health by medical treatment; —2dly, by critical evacuations and spontaneous recovery; — 3dly, in the develope-

ment or supervention of organic or fatal visceral disease. *a.* The *first* of these can be accomplished only slowly, and by judicious recourse to medicine, regimen, and moral discipline. *b. Critical evacuations* are rarely observed. *Diarrhœa*, particularly when caused by a copious secretion of bile, and followed by a resolution of hepatic engorgement or biliary obstruction, occasionally affords some relief; but it rarely removes the complaint, unless it be aided by additional means. The same remark applies equally to *hæmorrhagic discharges.* They furnish, however, indications of what should constitute, at least, a portion of the treatment in many cases. The spontaneous appearance of *cutaneous eruptions* has been noticed by Boerhaave, Lorry, Van Swieten, Heim, and Reil, as favourable occurrences; and enlargement of the external glands had also been considered critical by Stoll, Klein, and others.

12. *c. Organic, or fatal visceral disease*, is more liable to occur in hypochondriacs than in other persons, or than is commonly supposed. The parts most frequently undergoing structural lesion are the stomach, liver, and biliary apparatus, the brain and membranes, the large bowels, the heart and large vessels, the spleen, pancreas, uterus, and kidneys. Functional disorder of some one of these, in connection with derangement of its circulation, and with exalted organic sensibility and nervous susceptibility, most probably gives origin to most of the patient's sufferings; and as these disorders proceed onwards to organic lesion, the malady advances, until this lesion is expressed by signs, much less equivocal than those attending the earlier stages of the hypochondriacal affection. Insane delusions, melancholy, palsy, or epilepsy, may thus supervene from progressive structural change; but the former of these are by no means so common as generally believed. Palsy is a not frequent, and epilepsy is a comparatively rare, termination of this malady. Organic lesions of the heart and pericardium, as well as of the large bowels and urinary organs, are, however, oftener observed than has been supposed. The structural changes, met with in advanced or old cases of hypochondriasis, are chiefly the following.

13. IV. Lesions of Structure. — Various changes have been observed in the *digestive mucous surface*, the most important of which have been congestion, partial softening, discoloured spots, and slight ecchymoses. Thickening of the coats and induration, or an incipient state of schirrus of the pylorus, or cardiac orifice of the *stomach*, (Bonet, &c.) have been more rarely met with. The *liver* has presented various lesions, the chief of which have been congestion, enlargement of the organ, and dilatation and engorgement of the vena portæ (Lieutaud). I have found the *hepatic ducts* and *gall bladder* distended, enlarged, and filled with dark inspissated bile. Gall stones have also been found in the bladder and ducts. Alterations of the *spleen* have been observed by Bonet and others, and of the *pancreas* by Brandis. The *large bowels*, especially the sigmoid flexure of the *colon*, the *cæcum* and *rectum*, frequently present changes similar to those noticed with reference to the digestive mucous surface generally, or are thickened, or somewhat contracted; and the colour is sometimes displaced. Hæmorrhoidal tumours are often met with. A plethoric, engorged, or congested state of the abdominal viscera generally, has been remarked by Theden, Burggrau, and Leuthner. I have found calculi in the *kidneys* in one instance, and enlargement of the prostate gland and disease of the *bladder* in another. Alterations of the *uterus* have been noticed by some writers; and I believe that they are not rare in connection with hypochondriasis, especially after the change of life.

14. Organic disease of the *heart* and *large blood-vessels* is not unfrequent in hypochondriacs; but instances in which the structure and orifices and valves of this organ have been accurately examined after their death are remarkably rare. It is not improbable that some of the changes observed as a consequence of internal carditis, and of chronic inflammation of the large vessels, would be detected in some cases, if a careful inspection after death were instituted in persons who had been subject to this complaint. A plethoric state of the vascular system generally has been remarked by Winneke, and a very dark and altered state of the *blood*, by Thilenius and Burggrau. Various lesions have been found in the *brain* and its *membranes*, particularly in cases wherein the patient's chief suffering had been referred to the head; but these lesions have either been very different, in different cases, or very imperfectly described; whilst, in some, little or no alteration has been detected. In short, the bodies of hypochondriacs have presented lesions as diversified as the complaints made during life; but these lesions have been very frequently overlooked, or no inquiry after them has been made, owing to the circumstance of the complaints of this class of patients having been very generally viewed as entirely imaginative.

15. V. Diagnosis. — The diagnosis of hypochondriasis is most difficult; for the complaints of the patient are so distressing, and his sufferings apparently so extreme, that the inexperienced practitioner may be deceived by them, and believe them to proceed from dangerous states of disease, and to require the most energetic remedies. This simulation of organic and serious maladies, if it be not detected, may lead to a mischievous treatment. On the other hand, when a patient is known to be the subject of hypochondriasis, the circumstance ought not to induce us to overlook, or to treat carelessly, his sufferings, which are generally not only real, but also often depending upon structural changes, although these changes are either too obscure or too minute to be readily or easily detected. The versatility and mutations of the hypochondriac's sufferings, and the inconsistency observable between his complaints and his appearance, and between the local and general, or constitutional symptoms, will readily suggest the nature of the disease. Yet the symptoms sometimes continue without change; and the patient often makes the same complaint. In such cases, there is reason to believe that real disease exists, although exaggerated by his morbid sensibility and fears, by his imagination having long been engaged with his sensations in the seat of disorder. The want of relation between his feelings and constitutional symptoms ought also not to be too much relied upon; for, in hypochondriacs, the vascular system is not readily excited to febrile commotion, although the sensi-

bility is easily deranged and altered in a variety of situations, either successively or simultaneously. In every instance, there is the utmost necessity for patient investigation, and for the exertion of practical acumen. When the hypochondriac's sufferings are seated in the digestive organs, then a careful examination of the abdominal regions, and of the excretions, will generally indicate the extent of mischief, and show how much may be attributed to the patient's susceptibility or morbid sensibility; but when the complaints are referred to the head or heart, then the difficulty is greater; for we know that in these situations, structural changes may be slowly advancing, without inducing those physical signs and disorders of the functions of these organs, usually attendant upon more rapidly developed organic lesions.

16. The sufferings referred to the *digestive organs* have been imputed by Broussais and his followers to *gastro-enteritis;* and I believe that, in many cases, the circulation in the digestive mucous surface is more or less deranged: but this derangement is not identical with true inflammatory action. The organic sensibility and state of nervous influence in these parts are not the same in these complaints. In hypochondriasis, the patient can bear firm and prolonged pressure, although he may wince from a momentary or slight pressure, owing to his fears and morbid feelings. He generally has an unimpaired, or even a ravenous, appetite; is capable of using exercise, or even of undergoing fatigue, and is benefited by them. His bowels are usually costive, and his appearance is not materially, if at all, affected; and febrile symptoms are not observed. Whereas, in gastro-enteritis, firm pressure is generally not endured, the appetite is impaired, as well as the looks, strength, flesh and general health; and the bowels are loose and irritable, although the converse of this is sometimes observed. The spongy condition of the gums, the falling of them from the teeth, and the flabby state of the sides of the tongue, frequently observed in hypochondriasis, indicate rather a deficiency of tone and of vital cohesion of the digestive mucous surface, than inflammatory action.

17. The symptoms referrible to the *head* are often such as to rouse the anxiety of the practitioner, especially when they are attended by disorder of any of the functions of sense. Yet I believe that these symptoms more frequently depend upon disordered circulation, as well as altered sensibility, than is supposed. In this complaint, the state of the cerebral circulation is too often neglected, or not inquired into; and the sufferings of the patient believed to be either exaggerated or imagined. When his strength and healthy appearance are unimpaired, and the functions of the senses are uninjured; and when the temperature of the scalp and the action of the carotids are not materially affected, we may safely conclude, that the morbid feelings in the head do not indicate that danger, which the fears of the patient would imply; and this inference will be the more conclusive, if the patient have never experienced any apoplectic, paralytic, or epileptic seizure; and if he has been known to be subject to nervousness, low spirits, or hypochondriacal feelings. In many cases, however, of this malady, particularly in the second or third grades of it, increased action of the carotids, heat of the scalp, flushing of the countenance, suffusion of the eyes, &c., indicate cerebral plethora, or active congestion within the head, and sufficiently show that, although the sensations in this quarter may be exaggerated, they are by no means unreal.

18. The disorders referred to the *heart* and *lungs* are to be distinguished from such as are unequivocally organic, by attention to the physical signs. The palpitations and anxiety at the præcordia often complained of, are certainly chiefly nervous in their nature; but of this we have only negative proof. During the palpitation, a bellows-sound may be present, although it cannot be detected in the intervals. Yet I have known instances where it was at first heard only during the paroxysm of palpitation; but, after the lapse of a long period, it was heard more constantly. I believe that those distressing symptoms, although strictly nervous at early periods of the disease, either slowy or imperceptibly induce, or are attended from the beginning with, a slight and gradually increasing kind of organic lesion. Morbid states of the heart, as slow grades of inflammatory irritation, may exist, especially in the lining membrane of the cavities and large vessels, and occasion the distressing feelings complained of, although they may not be manifested by physical signs. When cough, and difficult or oppressed breathing, are present, their nervous or sympathetic nature may be readily determined by attention to their characters, by the absence or the appearance of expectoration, and by the signs furnished by auscultation and percussion.

19. Hypochondriasis has been often confounded with, or viewed as a variety of, *insanity*. It is important to discriminate between them. Dr. Prichard's remarks on this subject evince the correct judgment of this able writer. He observes, that an hypochondriac is in full possession of his reason, though his sufferings are not so dangerous, or so severe as he supposes them to be; but if he declares that his head or his nose has become too large to pass through a doorway, or displays any other hallucination, he has become a lunatic; his disorder has changed its nature; and this conversion takes place occasionally, though by no means so frequently as supposed. Hypochondriacs, however low-spirited or dejected, also suffer differently from persons affected with *melancholy*. The apprehensions of the former are confined to their own feelings and bodily health. On other subjects, they converse cheerfully, rationally and justly. But melancholics view all things through a gloomy medium. They despond on all subjects, and are mentally miserable, and independently of any severe bodily suffering. The affections and sentiments of the hypochondriac, especially to his former friends or to his connections, are not in the unnatural, or perverted state, observed in all the forms of insanity.

20. VI. Causes. — i. *Predisposing circumstances.* Hypochondriasis may commence at any age; from 21 to 55 in males, and from 30 to 60 in females. It is more frequent and more severe in the former than in the latter sex. It seldom occurs in females until after 30 or 35, hysteria being the form which nervous affections usually assume in them in early life; but it often commences about or soon after the cessation of the menstrual discharge, although rarely in so severe a form as in the other sex. It affects every

temperament or habit of body; but somewhat oftener the nervous, the melancholic, the sanguine and the bilious; and persons who are subject to hæmorrhoids, to constipation of the bowels, and to disorder of the digestive functions, and who are of a sallow complexion. Hereditary influence, or peculiarity of constitution transmitted from the parents, has, perhaps, some influence in predisposing to it, as WILLIS, HOFFMANN, and others have contended, although not in so remarkable a manner as in some other nervous complaints. Employments which are sedentary, or prevent due exercise in the open air, and which, at the same time, admit of activity of mind, also predispose to this complaint. Hence the frequency of hypochondriasis in shoemakers and tailors. Mental exertion and fatigue, or prolonged or overstrained attention and devotion to a particular subject, especially in connection with full living relatively to the exercise taken in the open air, may be said to be the chief sources of predisposition amongst the educated classes. Owing to these circumstances, this has been termed the disorder of literary men; but whoever is engaged in active mental pursuits, or in departments of business requiring great intellectual exertion, or occasioning anxiety of mind, is equally liable to it. Dr. PRICHARD observes, that agricultural labourers, who spend a great portion of their time in solitary employment in the country, are frequently the subjects of this complaint. Although solitary employment is likely to dispose the mind to brood over the evils that afflict it, yet much is probably also owing to the diet of field labourers, and to the influence of humidity and exhalations from the soil to which they are exposed, particularly in the reparation of ditches and hedges. The effect of climate in predisposing to hypochondriasis is not very manifest; but situations which are humid, and productive of terrestrial emanations, are apparently not without some influence in the production of it.

21. ii. *The exciting causes* may be divided into (*a*) those which act more immediately upon the mind, and consecutively, or through the medium of the mind, upon the organic functions; and (*b*) those which affect primarily those functions, and secondarily the mental energies. — *a.* Whatever exhausts, or directly depresses cerebral power, as intense application of the mind to difficult or abstract subjects, anxieties respecting schemes, speculations, or objects of ambition; disappointments, sorrow, fright, or sudden alarm; the depressing passions, severe losses of fortune or friends, indulgence of sombre or sad feelings; devotion to music and the fine arts, reading medical books, &c., and whatever favours congestion of the brain, as indulgences in bed, the use of narcotics, particularly opium, &c., may occasion this complaint.

22. *b.* The causes which act primarily upon the organic nervous system, and functions of the organic viscera are very diversified. Whatever impairs the energy of the system, as the too frequent or too liberal use of calomel as a purgative, or of other mercurials; poor, or innutritious diet, or the excessive use of tea and slops; a humid, close, impure, or miasmatous air, &c., may produce hypochondriasis. Mercurial purgatives, although often serviceable by promoting the discharge of bile, and giving relief for a time, yet often increase the nervous depression and morbid sensibility, when frequently resorted to, and induce or aggravate this complaint. Of the origin of hypochondriasis in an improper recourse to calomel, I have seen several instances. Whatever inordinately excites, or directly relaxes, the digestive mucous surface, as acrid cathartics, often exhibited, &c.; whatever occasions or perpetuates indigestion, or impedes the functions of secretion and excretion; and whatever occasions plethora of the vascular system generally, or of the portal or cerebral vessels in particular, especially overloading the digestive organs by too large meals, or by too rich or full living, the inordinate use of animal food, of malt liquors, wine, &c.; insufficient exercise, and inattention to the several excreting functions, may give rise to hypochondriasis. Whatever induces torpor, or perpetuates inaction of the depurating organs, whilst the organs of supply are stimulated to increased activity, will occasion redundancy of noxious elements, or of the ultimate products of animalisation, in the blood, and will, sooner or later, especially in connection with vascular plethora, give rise to this complaint, or to some other, depending, equally with it, upon oppletion of the vascular system. Persons who have been accustomed to active occupation, both physical and mental, or to much exercise in the open air, upon retiring from business with a competency, and when hoping to enjoy the fruits of industry, are often overtaken by this complaint, particularly if they live fully, and in a comparative state of ease and indolence. The vascular system, which was formerly preserved in a state of fulness, in due relation to nervous power, by the healthy action the different emunctories, now becomes overloaded, particularly the portal vessels. The cerebral circulation also becomes oppressed, and the mental energy impaired.

23. *c.* Some of the causes act by weakening both the organic nervous influence and the mind. The most injurious of these are premature and excessive sexual indulgences, particularly masturbation. Whenever hypochondriasis appears early in life, this should be dreaded as having been the chief cause. Many of the depressing passions, and anxiety of mind, act in a similar manner. As the early addiction to vicious habits, as well as several others of the exciting causes, is more or less frequent in all classes of the community, it cannot be said that the effect is confined to any particular class. Indeed, hypochondriasis is often met with in the lower orders, although not so frequently as in those whose minds are most highly cultivated, whose sensibilities are thereby rendered acute, and who are either precluded from, or not obliged to take, that exercise which is necessary to prevent general, local, or excrementitious plethora.

24. VII. PATHOLOGY. The ancients appear to have observed this complaint chiefly amongst philosophers, poets, and others endowed with the most acute sensibility, and the most vivid imagination; and to have either confounded it with, or viewed it as a variety of, melancholy. ARISTOTLE says, that all the great men of his time were melancholic, that is, hypochondriac. HIPPOCRATES, ARETÆUS, and others, attribute the complaint to an excess of black bile. DIOCLES refers it to the stomach, and GALEN considers it as a variety of melancholy, having its origin in this

organ. However much the ancients and older writers differ, as to whether it should be considered as a dyspeptic, or as a mental affection, they appear not to view it as connected with hysteria. SYDENHAM, however, describes hypochondriasis and hysteria as the same affection; without taking into account the chronic inflammations, obstructions, or lesions of structure so often associated with the former, and refers them to deficiency or irregularity of the animal spirits,—of the cerebro-spinal nervous influence, in the language of modern pathology. WILLIS considers it as a nervous complaint, seated in the brain; and ZACUTUS LUSITANUS, as an affection of the stomach and liver, depending upon coldness of the former and increased heat of the latter. BOERHAAVE thinks that it depends upon a viscid matter engorging the vessels of the organs seated in the hypochondria, as the liver, the spleen, stomach, pancreas, and the mesentery. STAHL and his followers suppose it to arise from efforts to establish a critical hæmorrhage; LOWER, from a morbid disposition in the mass of blood; and HOFFMANN, from too great a tension of the nervous system, sometimes in connection with inflammation of the digestive mucous membrane. From the time of HOFFMANN until that of CULLEN, various modifications and absurd combinations of the preceding opinions have been advanced. CULLEN observes, that this disorder occurs chiefly in persons of a melancholic temperament; that it consists of an affection of the mind, conjoined with dyspepsia, and is the result of a weak and mobile state of the nervous power. The opinions of CRICHTON and GOOD are deficient in precision and accuracy; they have confounded with hypochondriasis affections entirely distinct from it and from one another. LOUYER-VILLERMAY has formed more correct views of its nature and relations than most modern authors. He concludes that it is seated in the abdominal viscera, particularly in the stomach, and that these are affected in their nervous system or their vital properties, and especially in their organic sensibility. He conceives the disorder to consist in an alteration of the vital properties of the nerves of digestion, and an exalted state of organic sensibility, of which these nerves are the special conductors and receptacles. At the same time, he admits that the general sensibility and the cerebral functions become consecutively affected. This opinion is essentially the same as that of BICHAT; and it has been adopted by the author, and, more recently, by M. BRACHET and Dr. GULLY. M. BROUSSAIS contends that hypochondriasis is not merely a nervous affection, but that it is a result of chronic inflammation of the digestive mucous membrane; the morbid sensibility distinguishing it arising from the peculiar condition of this membrane, as respects its vascularity; and that the various ailments of which the hypochondriac complains proceeds from sympathy with this part of the digestive canal.

25. M. GEORGET argues, on the contrary, that the disease is primarily seated in the brain; that it is characterised by disorder of the functions of this part, unaccompanied by fever, or convulsive motion, or any manifest derangement of reason or judgment, and he adduces the following circumstances in support of his argument. 1. That the chief exciting causes of the disease exert their influence directly on the functions of the brain. 2. That the characteristic symptoms are referrible to the head. 3. That other symptoms observed in the complaint are not constant, some belonging to one organ, and others to another, whilst the digestive functions are occasionally not disordered. 4. That moral treatment is the most efficacious in the complaint.—There are several fallacies in the above inferences: It by no means follows, that, because certain occurrences make their first impression on the mind, the brain should be either principally or primarily affected by them. The depressing passions, however excited, produce a much more remarkable effect upon the functions, and even upon the organisation, of the heart, the stomach, the liver, &c., than upon the brain itself, unless indeed this last organ has previously been in a state of disease. The early symptoms, also, of hypochondriasis, are certainly not so referrible to the brain, as to the digestive and other organs, supplied by the ganglial class of nerves; and moral treatment is not always the most successful, or that which should be alone put in practice: it more generally constitutes only a part of a general plan.

26. Dr. PRICHARD observes that, when we take into consideration the mental dejection of hypochondriacs, the habitual state of their spirits, and the trains of morbid or painful sensations which torment them, we must admit that some deviation from the healthy state of the cerebral functions lies at the foundation of their ailments, though it is remote from organic disease, and of a kind of which we can form no conception. Many of the phenomena, he allows, would lead to the opinion, that the principal deviation from the natural state of functions, is seated in the nervous system of physical or organic life; but, phenomena involving consciousness and affections of mind, can hardly be confined to this part of the nervous system. Dr. PRICHARD, however, overlooks the fact, that the brain itself is as much supplied with the organic nervous system, as any other internal organ, and consequently that it will manifest disorder, whenever this part of the nervous system is seriously affected; and that this disorder will present similar characters as to kind — as to depression, perversion, activity or exaltation — to those displayed by other organs influenced by this system. The complaint, it is admitted, commences, or is first manifested, in the digestive viscera; and, it is not until the organic nervous system evinces great depression throughout the abdominal organs, that the functions of the brain become also manifestly depressed or impaired, and then the depression observed in the energies of these functions is similar in kind to that remarked in the digestive, secreting, and excreting actions; — these latter are performed slowly and imperfectly, — intellectual power, attention and application are also weakened. The sensibility of the organic nervous system, is morbidly acute in all or several of the viscera, — the cerebro-spinal system, and the dependent organs of sense and volition, are also morbidly susceptible, and incapable of the energetic exercise of their functions. The organic actions are performed with obscure sensations of distress, difficulty or anxiety, — the mental operations are attended by fear, distrust, and anxious bodings. The vital manifestations throughout the economy

are languid and relaxed, and the resistance opposed by life to morbid impressions remarkably weakened, — the faculties of the mind are equally languid, and the tone of the cerebro-spinal nervous system altogether depressed. Dr. PRICHARD supposes, that the occasional suspension of the complaint, for longer or shorter intervals of time, militates against the opinion, that the disease is owing to the state of the organic, nervous, and digestive functions; but this part of the nervous system is as likely to experience remissions and exacerbations of disorder as the brain and its dependencies. At the commencement, the affection of the organic or ganglial nervous system is confined chiefly to the digestive and excreting organs; but at a more advanced stage, it is extended to the brain, where it occasions the dejection of spirits, the fears, and the anxieties connected with the patient's feelings and ailments, characterising the fully developed complaint.

27. My views will be partly apparent from what has been now advanced. But, although the organic nervous system is evidently primarily and chiefly affected in hypochondriasis, and although the brain thus becomes consecutively implicated, other morbid conditions are also superinduced, and are more or less concerned in the aggravation or perpetuation of the patient's feelings and sufferings. Imperfect excretion compared with the supply of nourishment induces either absolute or relative plethora, as well as a morbid condition of the circulating fluids, owing to the accumulation of noxious matters — alimentary, saline, and animal — products of animalisation, which have not been eliminated from the blood. The chief vital organs thus become loaded and oppressed; and the nervous system and brain are rendered morbidly susceptible by the quality of the blood circulating in them. From considerable experience and close observation of the circumstances connected with the pathology and treatment of this complaint, I am firmly persuaded that these views constitute the only basis of a successful method of cure.

28. VIII. — PROGNOSIS. It is often extremely difficult to form an opinion, as to the presence of danger in this complaint. Even where the sufferings have been most distressing, the patient's life has apparently not been materially shortened thereby; and where they have been much slighter, death has occurred unexpectedly, and whilst the symptoms did not seem to indicate its approach. This may have been owing in part to the want of discrimination on the part of the practitioner, in not detecting organic lesion in the heart, brain, or other viscera. There can be no doubt, that many cases of obscure structural change in either of these organs, or in any other part, were formerly considered as hypochondriasis, and most injudiciously treated as such. Many of these would have been detected by the improved diagnosis of the present day, and thus the number of instances of the disease would have been diminished. Yet nevertheless, the existence of this complaint, or, in other words, of an affection of the functions and sensibility of the organic, and cerebro-spinal nervous systems, sometimes associated with, and heightened by, structural lesions, cannot be doubted; although M. FOVILLE has contended that it should not be considered as anything else than organic change in persons of acute sensibility; that both it, hysteria, irregular gout, and disorders of the fluids, belong to the same category; and that to one or other of these, the ignorant part of the profession refer those complaints, the true seats and natures of which they are unable to detect, — that, in short, they are names under which all others but the morbid anatomists conceal their ignorance. Now it may be stated without much fear of injustice, that those who see nothing in disease, but what is demonstrable after death, and who believe in nothing pathological, which is not material and palpable, will very often arrive at wrong conclusions, as to the origin, nature, course, and treatment of the most important maladies of our species.

29. The *Prognosis*, however, relates more to the probable recovery of the patient than to any danger more or less immediately attending it. Of the existence of danger, the signs of organic change will be the chief harbingers, and upon the detection of these, and upon the inferences formed as to the seat and nature of existing lesion, the opinion will necessarily depend. — *a*. The circumstances, which may be considered as *unfavourable* to the patient's complete recovery, are not always very manifest or readily ascertained; but, if the causes are not removable, or chiefly of a moral kind, — if the disease is confirmed, or if the patient has had repeated attacks, — if it has supervened upon the suppression of the hæmorrhoidal flux, and is not removed by the restoration of this evacuation, or upon the disappearance of the catamenia at the usual period, — if sleep is not obtained without recourse to narcotics, — if the imagination is powerfully affected, and constantly influenced by moral causes, the physical indications of disease being slight, — if the nervous affection is associated with serious disorder, or with signs of structural change of some important viscus or with some mental delusion, — and if the patient indicates much suffering in his appearance, or the melancholic temperament, or a cachectic habit of body, — we may expect to alleviate, but we can hardly hope to remove, the malady, although the removal of it may be accomplished.

b. A more favourable opinion may be entertained, if the chief ascertained causes are removable; if the disease is recent, or only in the first or second stage; if the patient is of a sanguine temperament; if the circumstances or profession of the patient admit of exercise, or salutary employment of mind or body, and of travelling, or repeated change of air during the treatment; if he enjoys his nightly repose, and possesses his usual or natural looks; if the test of BAGLIVI — "In chronicis morbis si facies naturalis sit, ac boni coloris, nunquam crede adesse obstructiones, aliaque vitia in visceribus" — is applicable, and if the unfavourable circumstances enumerated above are not present. — Hypochondriasis has been removed by the supervention of other diseases, as diarrhœa, dysentery, fever, jaundice, dropsy, &c.

30. IX. — TREATMENT. Hypochondriasis would be more frequently cured, if stricter attention were paid to the removal of the circumstances in which it originated, and to the combination of physical and moral treatment appropriately to the pathological states just considered. But the disease is generally advanced or confirmed, before proper medical advice is resorted to, — the patient has been for some time exciting his imagination,

and aggravating his morbid sensations by reading medical works, which might mystify but could not instruct him as to his ailments, and dabbling in physic, which might confirm, but could rarely relieve, his complaints; — he fails in his own efforts, and then, if he have recourse to a duly qualified adviser, he expects, and is impatient if he does not derive, immediate benefit. Many hypochondriacs also adopt neither the restricted diet, nor the regimen prescribed for them; and thus the treatment fails more from the fault of the patient, than from the means employed.

31. i. *The first indication*, in the treatment of hypochondriasis, is *to remove the remote causes, the habits, circumstances, and moral influences, to which the patient has been, or is subjected.* The *diet* should be restricted, and regulated with reference to the patient's habits, occupations, and daily amount of exercise; and he ought to be engaged, as much as possible, with objects calculated to interest, but not to fatigue, the mind. With the affluent this is a matter of difficulty, and is often only to be accomplished by travelling. In the good old monkish days, pilgrimages to the shrines of saints were recommended for the benefit both of soul and body; but in modern times, since these have become divided cures, saintly interference has been but little confided in, and the purifying operation of mineral springs has alone been considered efficacious. And, certainly, the good effects resulting from faith in either, or in both these agents, have neither been few nor equivocal. The shrewd practitioner, who plants himself by the side of a saline or chalybeate mineral spring, or any other spring possessing deobstruent and tonic properties, and situated in a dry and salubrious air, if he succeed in attracting hypochondriacs to his Hygeian temple, by the usual direct or indirect means, will generally relieve many of the more faithful of his worshippers. The lawyer, the merchant, the stockbroker, and others, who have weakened their digestive organs, exhausted their nervous systems, and over-excited or tortured their brains, by application to business, by the vicissitudes of affairs, and the anxieties which are consequent thereon, when induced to visit a watering place, will frequently derive benefit from the moral and physical changes thereby occasioned. Instead of over-exciting or distracting the mind with business, of overloading, and perhaps over-stimulating the digestive organs, of allowing the liver and bowels to become torpid, of neglecting due exercise in the open air, and of respiring the impure atmosphere of a crowded city or manufacturing town, the hypochondriac is properly directed to relinquish the anxieties of affairs, to conform to a limited diet, to keep his bowels very freely open, to walk and ride a certain number of miles daily at prescribed times, and to drink the waters, whether aperient, deobstruent, or chalybeate. The result cannot be doubtful in many cases. The entire removal of the causes of disorder, the exercise, the change to a purer air — the thorough alteration of habits, of circumstances, and of atmosphere — all combine to produce benefit; and the physician, as well as the spring, obtains a credit, to which the amount of merit really possessed by either by no means entitles them, and which is often heightened by the circumstance of advice previously given to the patient — whilst he is immersed in business and distracted by anxieties, when precluded from exercise and amusement, and when constantly subjected to the combined operation of the causes of the malady — having failed in accomplishing what was probably most judiciously attempted, but which he was counteracting in the most efficient manner in his power.

32. The best means of fulfilling this indication is by *travelling*, and by due *attention to the diet, and to the excreting functions.* Continued residence at a single watering place is not nearly so beneficial as travelling, unless much exercise be daily taken. Travelling, aided by mineral waters suited to the peculiarities of the case, has the best effect; and, next to this plan, judicious medical treatment, pursued at the same time with change of air and scene. The very incidents connected with travelling, as Dr. PRICHARD remarks, abstract the patient's attention from his feelings and sufferings; and, even the temporary disorders that may occur, as rheumatism, cold, and diarrhœa, produce this effect in a still more remarkable manner. When mineral waters are resorted to, either alone, or in connection with travelling, those which are aperient and deobstruent should be first used, as the waters of *Seidschutz*, or *Pullna*, or *Cheltenham*, or *Harrowgate*, &c.; and subsequently those of *Bath*, *Carlsbad*, or *Marienbad*, *Pyrmont*, or *Tunbridge*, &c. The springs of *Schwalbach* and *Pyrmont* were much extolled by HOFFMANN; those of *Eger* and *Marienbad*, by HEISTER and HUFELAND; and the waters of *Pyrmont* and *Seltzer*, by MARCARD. The baths of *Wiesbaden* have also been praised by RITTER and others. During a course of Chalybeate waters, the bowels ought to be kept moderately open, either by aperient medicines, or by the more aperient or purgative waters. Exercise of all kinds is more or less beneficial; but that on horseback, or on foot, or both, is perhaps preferable. The former was much praised by SYDENHAM and FULLER; but, whatever kind of exercise be adopted, it is necessary to regulate the bowels, to promote the functions of the emunctories, to remove the patient from the pursuits, anxieties, and circumstances, which induced the complaint, or to change his habits, and to amuse and interest his mind.

33. ii. *The second indication is to evacuate morbid secretions and accumulated excretions, to correct the morbid states of the digestive canal, and of the organs immediately connected with it, and to relieve the more distressing feelings of the patient.* It is indispensable to the obtaining of the confidence of the patient, and, consequently to the successful management of his case, that his various ailments should be attentively heard and patiently investigated; that they should be altogether viewed as real, and that the treatment should be prescribed for him with clearness and with decision. However much the practitioner may doubt as to the origin or nature of the complaint, and however much he may despair of the efficacy of the means prescribed, he should conceal his doubts, treat the sufferings and feelings of the patient with sympathy, and arrange and combine the means of cure into a method at once consistent and appropriate, which is to be faithfully pursued in all its parts. Confidence will be thus inspired, without which he will neither derive benefit nor continue under treatment.

34. *a.* The propriety of having recourse to *mild* or *stomachic* purgatives, when the bowels are sluggish or torpid, or the stools offensive, cannot be questioned. Yet, in some cases, the *gastro-intestinal mucous surface* may be in such a state of irritation or of chronic inflammation, as to require these to be prescribed with caution, and selected with judgment. When this state of the digestive mucous surface is present, *leeches* should be applied to the abdomen, or to the anus: *refrigerants* should also be given with *mucilaginous* or *emollient medicines*, (F. 355. 431. 436. 821. 837. 865.) and the functions of the skin promoted by the *warm* or *vapour bath*. If the patient be plethoric, a moderate *venesection* or *cupping* on the nape of the neck, or a repetition of leeches to the epigastrium or anus, will be of service. Although irritating purgatives are hurtful in this description of cases, yet those of a mild or of a cooling kind ought not to be withheld; and their operation may be promoted by enemata. The tartrate or sulphate of potash, the carbonate of soda or magnesia with rhubarb, either in powder or infusion; or the phosphate of soda, or the tartrate of potash and soda, may be given with other substances, (F. 440, 441. 868.) according to the peculiarities of the case. The *diet* should be restricted chiefly to mucilaginous or farinaceous articles, and the beverages consist of simple saline or cooling fluids.

35. In other cases, particularly where the digestive mucous surface is deficient in tone, and when the states of the epigastrium, of the pulse, and of the tongue do not indicate inflammatory irritation, *purgatives* or *aperients* of a warmer or more stomachic kind than the above may be prescribed. The infusion of senna, or that of rhubarb, may be given with the infusion of gentian or of columba, or of cinchona, or of cascarilla, and an aromatic or carminative tincture and a neutral salt: or the aperients directed above (§ 34.) may be taken in mint-water. In many cases the compound *galbanum pill*, or *assafœtida*, may be conjoined with the purified *extract of aloes*, or with *rhubarb*, and the inspissated *ox-gall* (See F. 547, 548. 558—563. 572—576.), either at night, or daily with dinner. I have found the following excellent in hypochondriasis with a torpid state of the large bowels.

No. 259. ℞ Pulv. Rhei ʒ ss.; Pulv. Ipecacuanhæ, Pulv. Capsici, āā gr. vj.; Extr. Aloes purif. ℈ j.; Extr. Fellis Tauri ʒ ss.; Saponis duri, gr. xij.; Olei Carui, q. s. Contunde benè; et divide in Pilulas xxx., quarum capiat unam vel duas quotidiè cum prandio.

No. 260. ℞ Extr. Fellis Tauri, Massæ Pilul. Galb. Comp. āā ʒ ss.; Extr. Aloes purif. ℈ j.; Saponis duri, gr. x.; Pulv. Ipecacuanhæ, gr. viij. M. Fiant Pilulæ xxx. Capiat unam vel duas, ut suprà.

36. The use of *laxatives* in hypochondriasis was much insisted on by Renouart and Legier, and various substances belonging to this class were recommended: but they require no very particular remark at this place. *Magnesia*, especially the calcined, is well deserving of adoption, when the complaint is attended by a copious deposit of salts in the urine, or by a gouty diathesis. It also relieves the flatulence and distension of the epigastrium and hypochondria more certainly than any other aperient. When there is no gastro-intestinal irritation, or if this be slight only, it may be given in mint-water, or in any tonic, stomachic, or aromatic vehicle. Precipitated *sulphur* was much praised by Bisset, and is certainly an appropriate laxative, particularly as the use of it for some time increases all the excretions, and especially those from the skin, bowels and liver.

37. *b.* Many of the distressing feelings of the patient are referrible to *irritation* in some part of the digestive mucous membrane. This irritation may exist in the *rectum* in connection with hæmorrhoids, or in the *cæcum*, or in any other part of the canal: but these two are amongst its most common seats. In such cases, it is propagated by the communicating ramifications of the ganglial nerves to the roots of the spinal nerves, or to the spinal chord, and sensibly expressed in some remote part by *reflex sympathy*, as stated in my notes to Richerand's *Elements of Physiology* (p. 34. Lond. 1824. 2d ed. 1829.). The *hæmorrhoidal discharge* has been considered favourable in hypochondriasis by Alberti, Grant and others; but, as already stated (§ 6.), it indicates either general or local plethora, when it has not been induced by costiveness or by acrid purgatives, and points to restricted diet. When the hæmorrhoids are not attended by any discharge, they furnish the same indications and show that, in addition to low diet, general or local bloodletting should be prescribed. Without these, the removal of the hæmorrhoidal affection may not be entirely devoid of risk to the hypochondriac, especially if regular exercise in the open air be not taken.

38. *c.* Simple *lavemens* or *enemata* have been too generally neglected in the treatment of this complaint. The researches of Pinel, Annesley, and of the author, show that the large bowels are not only disordered in their functions, but also often altered in structure, or even displaced in the more severe and chronic cases. The depressed state of organic nervous energy, occasioning hypochondriasis, permits fæcal and flatulent accumulations to form in the *cæcum*, *colon* and *rectum* (see these *articles*), causing inordinate distensions of portions of the canal with spasmodic constriction of adjoining parts. Owing to the fæcal collections, to the efforts of one part of the bowel to propel its contents through a torpid or an obstructed portion, and to the frequent recurrence of these states, displacement of portions of the colon, and even partially of the cæcum, are not rare. Inordinate dilatation of the latter viscus is also sometimes observed. But I have remarked, in several cases of hypochondriasis complicated with hæmorrhoids, or with spasmodic stricture of the sphincter ani, or with fissure or some other source of irritation in the anus, a remarkable *dilatation of the rectum* within the sphincter. In these instances, the dilatation amounted to a sacculated state. This had evidently proceeded from inordinate accumulation of fæces, owing to the obstacle to their discharge, caused by internal hæmorrhoids or by spasm of the sphincter. One of these had been treated for stricture of the rectum, and a bougie frequently passed; but it seldom found its way into the portion of the bowel above the dilatation. The intestine was injured by this officious interference; peritonitis supervened; and near the fatal termination of the case I was consulted. Inspection after death furnished a striking example of this dilated state of the rectum, as well as of the effects of a species of interference generally quite unnecessary, although so frequently practised at the present day by a few

surgeons, as to render it disgusting, particularly as it is warranted neither by the history and nature of the case, nor by sound therapeutical views.

39. In the early stages of hypochondriasis, especially, and as a means of preventing costiveness and the above, as well as other consequences of this state, *enemata* of various kinds, according to the peculiarities of the case, ought to be frequently employed. Simple water, tepid or cold; emollient, oleaginous, or saponaceous fluids, and various saline solutions, will be thus administered with benefit, and will not only promote the action of the aperients just mentioned, but, when daily used, will establish a regular state of fæcal excretion. (See *the Formulæ for Enemata in the Appendix.*)

40. *d.* Whenever the complaint is connected with vascular *plethora*, or is consequent upon the suppression or disappearance of some accustomed evacuation, and when it has been fully developed, an oppressed or *congested state of brain* may exist. But whatever may be the state of circulation in the capillaries or sinuses of this organ, there can be no doubt of the propriety of a moderate *depletion*, by cupping on the nape of the neck, in these cases. I have prescribed it in several instances with marked benefit; and in one gentleman I carried the depletion to thirty ounces at a single operation with the greatest advantage. Many of the patient's distressing feelings depend upon the superinduced disorder of the circulation in the brain, particularly those which are referred to the head, and to the organs of sense and volition. In some cases, however, of this description, blood should be abstracted with caution, and it will sometimes be necessary to promote nervous energy and tone, even whilst we have recourse to depletions and evacuations. Whenever the hypochondriac has encreased heat of scalp with a firm pulse, these latter may be safely prescribed in moderation, and may be aided by cold-sponging the head night and morning, or by daily recourse to the *cold douche* or *shower-bath*. The extremities, especially the feet, of this class of patients are generally cold; this circumstance should receive due attention. When the sufferings are referrible to the brain it will be useless, and indeed sometimes injurious, to attempt to alleviate or suppress them by powerful narcotics. Even when these give temporary relief, more permanent mischief is often occasioned. The means already noticed, both regimenal and medicinal, will be much more efficacious; and, if these fail, when pushed sufficiently far, organic lesions probably exist, for which setons, issues, &c. may be tried, although with but slight prospect of advantage.

41. *e.* If the complaint is associated with *palpitations* or *irregular action of the heart*, or with a *dry nervous cough*, much benefit will result from *camphor*, conjoined with *narcotics*, and sometimes, also, with *refrigerants* and *demulcents*. A weak decoction of *Senega*, with orange-flower water, or with any other aromatic and demulcent fluid, and with small doses of *prussic acid*, or of some other anodyne, will often, also, be of service. If the *liver* be congested, or otherwise disordered, the treatment should be modified accordingly. The majority of cases of this kind, particularly if the patient have lived fully or taken little exercise, will bear *depletion*, especially cupping on the right hypochondrium, or below the right shoulder, or the application of leeches to the anus. A dose of *calomel*, or of Plummer's pill, or of blue pill, may also be prescribed; but it should either be conjoined with an aromatic, or some purgative, or be followed, in a few hours, by a stomachic aperient. Hypochondriacs are generally very susceptible of the specific action of mercurials, and their mental depression and nervous sensibility are much increased by them: yet, with due caution, and if not often resorted to, they are beneficial, when the functions of the liver are impaired. The supertartrate of potash, the preparation of *Taraxacum*, and the carbonates of the *alkalies*, with stomachic purgatives, are also of great service in a torpid state of this organ. When, in connection with this, or with a morbid state of the biliary and other abdominal secretions, the hypochondriac complains much of *colicky pains*, with costiveness, flatulence, distension, &c., these, and the mild purgatives already mentioned, calcined *magnesia*, with antispasmodics or carminatives, or with small doses of *ipecacuanha* and *hyoscyamus*, should be steadily employed for some time, and be aided by emollient diluents, by *demulcents*, and by *saponaceous* or *oleaginous enemata*. Castille soap may also be conjoined with the other substances, given in the form of pill.

42. iii. *The third intention is to restore the energy and healthy functions of the organic, nervous, and cerebral organs.* — *Tonics* have been too commonly prescribed prematurely in hypochondriasis, or when the digestive mucous surface, or the brain, or the liver, has not been in a state to derive benefit from them. They are even prejudicial in most of the circumstances which have now been considered, unless in combination with purgatives, especially when these parts are in a state of irritation or congestion, and until this be removed, they may even aggravate the complaint. But when the excretions have been duly promoted, appropriate evacuations procured, and visceral congestion removed, a judicious recourse to them is often of great service. During a course of tonics, the bowels should be kept regularly open, and local irritation or determination of blood prevented or removed, should either appear. The *Chalybeate mineral springs*, already mentioned (§ 32.), are especially beneficial, when tonics are indicated. The preparations of *Iron*, particularly the sulphate, the ammonio-chloride, the potassio-tartrate, and the sesqui-oxide, may be substituted, with advantage, for mineral waters; but if they occasion fever or headache, they will generally be injurious, unless conjoined with saline refrigerants. If *gastrodynia* is complained of, the tonics may be given with anodynes or narcotics, as the *Hydrocyanic acid*, *Hyoscyamus*, the compound *tincture of camphor*, &c., or with the carbonates of the *alkalies*; — the *Tris-nitrate of bismuth* may be prescribed in similar combinations. Where there is a tendency to plethora, tonics, and especially chalybeates, should not be employed, without attention be paid to exercise and diet. When tonics prove too heating, the bitter infusions or decoctions may be prescribed, with small doses of *Nitre*, or of the *Hydro-chlorate of Ammonia*.

43. When Hypochondriasis seems consequent upon venereal excesses, or upon solitary indulgences, or when the sexual appetite is increased, as is sometimes the case, tonics are more especially

indicated, and may be prescribed from the first, if the bowels be kept regularly open. In such circumstances, vascular depletion is contra-indicated, and evacuations of any kind ought to be cautiously practised. The chalybeate mineral waters, soda water, or other waters containing fixed air; the vegetable tonics, with soda; the tincture of the sesquichloride of iron, taken in camphor mixture, &c., are most appropriate in such cases, aided by early rising, and exercise in the open air.

44. iv. A *Fourth Indication* has been advised by some writers, viz. *to restore to its proper seat or form any other complaint, upon the removal or spontaneous cessation of which the hypochondriacal affection had supervened.* This intention, however, cannot be often fulfilled, for an herpetic eruption may not be restored, although an artificial eruption may be easily produced. The restoration of an hæmorrhoidal flux is more readily procured; but a judicious recourse to local depletions, and to suitable diet and regimen, will be still more beneficial. The developement of the gouty paroxysm, when hypochondriasis follows the disappearance of gout, has likewise been advised; but attempts to accomplish this do not always succeed: they may even aggravate the complaint. The means just mentioned will sometimes prove so serviceable, as to render such attempts unnecessary; and yet I have seen instances in which these means have failed, and for which I have been obliged to recommend a more liberal diet and regimen, with change of air, travelling, &c. When hypochondriasis follows periodic fevers, this indication is entirely out of the question. In these cases, as well as in those produced by malaria, humidity, &c., the chylopoietic viscera are generally in fault, and require, especially the biliary organs, strict attention. If this complaint is consequent upon suppressed discharges from the uterus, or is even associated with an increase of the natural evacuation, or with a morbid secretion from this organ, particularly about the change of life, organic change in the uterus may be the cause of the nervous disorder; but the restoration of the discharge in the one case, or the removal of the morbid secretion in the other, will have but little effect, either upon the lesion of the uterus, or upon this affection. The nature of this lesion, and the states of the vascular system, and of the digestive viscera, will require the chief attention in these circumstances.

45. v. *Remedies and Modes of Practice advised by authors.* — *a. General bloodletting* has hardly been noticed by any of the numerous writers on hypochondriasis; and *local depletions* have been directed by few excepting to the anus, in order to remove hæmorrhoids, or hepatic fulness. M. Broussais and Dr. Gully, however, recommend leeches to be applied to the epigastrium on account of inflammatory irritation in the digestive mucous membrane, which they consider to exist in most cases of this complaint; and which no doubt forms a part of the pathological states in many cases. In these, an *antiphlogistic regimen* is always requisite, although too frequently neglected by both patient and practitioner.

46. *b. Aperients* and *laxatives* are generally serviceable when judiciously selected; but acrid purgatives are often injurious, although not to the extent believed by Broussais and his followers, unless they be frequently prescribed. My objections to mercurial purgatives (§ 41.) in hypochondriasis are not altered by what has been advanced by Wintringham, Rieff, Curry, and others, in their favour. At the commencement of this century, a calomel epidemic prevailed in British practice, and this medicine was prescribed very generally, and very often injuriously, in this and many other complaints. The repeated doses of it directed by the late Dr. Curry, not unfrequently aggravated the disorder, or converted it into melancholia. The much milder means, however, recommended by the late Mr. Abernethy, namely, an occasional blue-pill at bed-time, and a stomachic aperient in the morning, were often of great benefit, and were rarely attended by any inconvenience.

47. *b.* The propriety of prescribing *narcotics* and *anodynes* in hypochondriasis has been much discussed. Circumstances often arise to require a prudent recourse to them, and others appear which contra-indicate them. Some of them, particularly *opium*, afford temporary relief, and yet are injurious if largely or frequently employed. — *Opium* was recommended by Tralles (*De Usu Opii*, s. iii. p. 35.), Deidier (*Consult. et Obs.* t.i.), and others, and by Thilenius in conjunction with the mineral acids. Dr. Cullen considered it injurious. Hypochondriacs often resort, and readily become addicted, to it; but, unless when under its influence, all their distressing feelings are aggravated by it. Even when used in moderation, it is relinquished with difficulty. I have met with several instances of hypochondriasis, presenting in some an hysterical character, as in females, and in others, the melancholic, in which opiates had been prescribed occasionally for severe or painful symptoms, and in which calomel had been given as an aperient; and in these the patients afterwards had resorted to the same means without medical advice, until the former was regularly taken in excessive doses, every three or four hours, and the latter every second or third night. In two cases, where the acetate of morphia, and in one, where the muriate had been prescribed, these substances were long afterwards continued three or four times in the day, on account of their effects upon the spirits, and gradually increased to one or two grains each dose. In neither of these was there any organic disease detected upon the strictest examination, although there was much functional disorder of the digestive organs. The strength and healthy looks of these patients are now almost restored, by reducing very gradually the dose of the narcotic: by relinquishing calomel, and by enforcing the practice recommended in this article. Yet I fear that the opiate will never be entirely given up, and that the dose of it will even be increased hereafter. In such circumstances no patient can be trusted. The practitioner, in order to overcome this noxious habit, may try the effect of varying the narcotic, of adulterating it, or of combining it with tonics, aromatics, &c.; of diverting the mind by amusement or travel, and of rousing the vital energies by early rising, exercise, tonics, and light diet. Persons who have habituated themselves to opiates will, however, rarely tolerate any other narcotic. I have prescribed for them *hyoscyamus*, *belladonna*, and *conium*. The first and last of these were too weak: the second seemed for a while to answer, but was soon relinquished. These, however, are

often beneficial in this complaint, especially in certain of its complications, in conjunction with camphor or other antispasmodics, or with purgatives, stomachics, &c.; or with tonics or carminatives, according to the numerous modifications it assumes. The *hydrocyanic acid* is also very serviceable in similar circumstances and combinations, to those in which narcotics are indicated. Thilenius and Wurzer recommended the laurel water in this complaint long before the discovery of its active principle.

48. *c. Tonics* of various kinds have been prescribed in order to rouse the nervous energy: but they require much discrimination for the reasons already stated (§ 42.). As congestions and obstructions of important viscera also should be removed, they ought to follow, or to be conjoined with, means calculated to fulfil this intention, and selected with due reference to it. On this account the preference given to *chalybeate mineral waters*, by Zacutus Lusitanus, Drelincourt, Hoffmann, and others, especially those springs which contain deobstruent and aperient salts, along with the iron, is fully justified. I have seen the *arsenical solution* given in some instances, but it is a precarious medicine in this complaint, — it may be even hazardous, and it is not justified even by the circumstances of the affection having followed periodic fever. I have rarely seen any benefit result from even a moderate use of *wine*. It may afford a temporary relief, but it is most frequently injurious, by increasing vascular plethora, and visceral engorgement. Circumstances, however, may arise, in which it should be prescribed medicinally.

49. *d.* Small doses of *ipecacuanha* have been advised by Hufeland, but they are most serviceable in conjunction with *purgatives*, in order to increase their action, or with *diaphoretics*, when the skin is dry and harsh, and then they should be aided by the warm-bath. The production of *artificial eruptions*, as advised by Ritter, Jenner, and the author; or the insertion of *setons*, or *issues*, as directed by De Meza and others, is often of service, particularly when there is evidence of irritation, or of congestion or obstruction of some internal organ. In these cases, the application of *moxas* or of *blisters*, or of stimulating and *rubefacient liniments*, may likewise be tried.

50. *e.* Dr. Gully justly remarks respecting the *Hygeienic treatment* of hypochondriasis, that the mental distractions accompanying the participation in exciting social scenes, the vigorous exertion of the voluntary power implied in strong muscular exercise, and the shocks given to the entire nervous system, are always beneficial in this complaint. The hypochondriac should be persuaded to the exertion of his volition in active muscular exercises. He does not lack muscular power, but he wants the mental energy necessary to its exertion. He should always walk or ride before his meals, rise early, and take half an hour's exercise in the open air before breakfast. His mental faculties also should be actively engaged, as this writer very judiciously advises, on matters alien to his personal health. His imagination should be roused and directed towards other subjects. Although perturbed only with reference to his health, his fears should be met by the reasoning and feeling of his physician, who should endeavour to gain his confidence by evincing a due interest in his case, and combat his morbid feelings in a manner which an educated tact will readily suggest.

51. Upon the whole, although the treatment of hypochondriacs requires to be modified in a thousand ways to meet the innumerable phases of the complaint, and fancies of the patient, the means advised by Stoll (*Rat. Med.* P. i. p. 245.), will be found the most generally appropriate, and the most beneficial, if persevered in: these are, abstemious diet, early rising with friction of the abdomen in the morning, cold bathing and warm clothing, and exercise in the open air.

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HYSTERIC AFFECTIONS.—Syn. *Hysteria*; *παθος ὑστερικον* (from *ὑστερα*, the womb), *ὑστερικη πνιξ*, *Suffocatio Uterina*, *Suffocatio*, *Suffocatio Mulierum*, Pliny. *Affectio Hysterica*, Willis, Sydenham. *Malum Hysterico-hypochondriacum*, Stahl. *Asthma Uteri*, Van Helmont. *Ascensus Uteri*, *Strangulatio Vulvæ*, *Passio Hysterica*, Auct. var. *Hysteria*, Sauvages, Linnæus, Vogel, Cullen. *Hyperkinesia Hysteria*, Swediaur. *Clonus Hysteria*, Young. *Suspasia Hysteria*, Good. *Vapeurs*, *Mal de la Mère*, *Affection Hystérique*, Fr. *Mütterkrankheit*, *Mütterbeschwerden*, *Aufsteigen der Mütter*, Germ. *Isterismo*, *Mal di Matrice*, Ital. *Fits of the Mother*, *Rising of the Mother*, *Vapours*, *Hysterics*, *&c.*

Classif. — 2. *Class*, Nervous Diseases; 3. *Order*, Spasmodic Affections (*Cullen*). 4. *Class*, Diseases of the Nervous Function; 4. *Order*, Affecting the Sensorial Powers (*Good*). II. Class, III. Order (*Author*, in *Preface*).

1. Defin. — *Nervous disorder, often assuming the most varied forms, but commonly presenting a paroxysmal character; the attacks usually commencing with a flow of limpid urine, with uneasiness or irregular motions, and rumbling noises in the left iliac region, or the sensation of a ball rising upwards to the throat, frequently attended by a feeling of suffocation, and sometimes with convulsions; chiefly affecting females from the period of puberty to the decline of life, and principally those possessing great susceptibility of the nervous system, and of mental emotion.*

2. Under this definition may be arranged all those disorders which, from their varied and changing forms, and their resemblance to many serious, and even to several dangerous or structural diseases, have puzzled and misled the inexperienced. Sydenham first gave a full, and, upon the whole, a satisfactory account of hysterical affections; and Whytt more recently threw additional light on several of their forms and relations. Cullen accurately described their more convulsive states, but neglected those anomalous or irregular forms of complaint, which are equally frequent and important with these. From the descriptions of Good, Macintosh, and some other recent writers, it might at once be inferred that their experience as to this disorder was very imperfect; that they were entirely ignorant of the writings of Sydenham and Whytt; and that the state of our knowledge in respect of it had retroceded, instead of having advanced, with the general progress of science. Very recently, however, the able and elegant treatise of Dr. Conolly has retrieved the character of our literature as to hysteria, and furnished us with a more comprehensive view of its nature and treatment.

3. The varieties, forms, and states of hysterical affection are so numerous, that the difficulty of describing and arranging them is very great. The modifications consequent upon age, temperament, diathesis, habit of body, states of nervous susceptibility, physical and moral education, and on the states and grades of society, are so various, that they cannot all be comprised within the limits to which I am necessarily confined. Enough, however, will be advanced to guide the practitioner to the recognition of the nature of such affections as may not fall exactly under any of the varieties

into which I shall divide this complaint. The difficulty of accurately describing disease is great, inasmuch as the phenomena constituting it vary in every case with the circumstances just enumerated, with the causes producing them, and with numerous accidents and occurrences, independently, even, of their duration and intensity; but it is especially great in respect of hysteria. In the history about to be given of it, I shall notice — 1. Its more mild and regular forms; — 2. Its more severe states; — and, 3. The more irregular and anomalous conditions or modes in which it sometimes manifests itself.

4. I. THE MILDER AND MORE REGULAR FORMS OF HYSTERIA present various modifications, depending chiefly upon the number of the circumstances or symptoms characterising them. — *a*. They appear generally in paroxysms or fits, and commonly begin by painfulness or uneasiness in the left iliac region, or hypogastrium, or in the left side; and are often preceded by a large flow of limpid urine, or by palpitations, or difficulty of breathing, flatulency, and rarely by nausea, or vomiting. From either of these situations in the abdomen, a ball, the *globus hystericus*, seems to move, with a rumbling noise, and with various convolutions, to the stomach, and thence to the throat or pharynx, where it remains for some time, and gives rise to a feeling of impending suffocation. The attack in its slighter forms may not proceed further, or it may be attended by several other phenomena of a slight or severe kind. In some cases, headach, stiffness about the larynx, dyspnœa, general uneasiness, cramps, &c., precede or accompany the attack; in others, a vermicular or undulating motion of the abdominal muscles attends the rising of the ball, or *globus*.

5. *b*. The seizure, however, may not end with a sense of strangulation, attending the ascent of the ball to the throat. Other phenomena either attend this, or rapidly follow it, particularly lassitude, sadness, despondency; a sense of coldness, stiffness, or weight in the limbs, with sudden and momentary spasmodic contractions, or general shudderings; headach, noises in the ears, or vertigo; pain and flatulence of the stomach; irregular distension of the abdomen, with borborygmi; a sense of constriction in the throat and pharynx, sometimes with swelling; oppression at the chest, dyspnœa, and irregular breathing; and palpitation, or irregular action, of the heart. These fits may occur at any time through the day, but usually two or three hours after a meal. After a time, either copious eructations of air take place, or anguishing pain at the epigastrium, or in the left side, supervenes, which the patient endeavours to relieve by rubbing violently with the hand. She is frequently incapable of utterance, although evincing much bodily and mental agitation, which generally terminates with immoderate or continued fits of laughter, sometimes causing temporary or alarming suspension of respiration, or with fits of weeping, without any assignable cause, or with an alternation of both. With these latter symptoms, the attack may cease. It may recur in a short time, or not for a considerable period.

6. *c*. *When hysteria assumes a truly convulsive form*, spasmodic actions follow upon the feeling of suffocation, occasioned by the globus hystericus, as it reaches the throat. In delicate women, with great mobility of the muscular system, the convulsions are feeble, and present chiefly a clonic or asthenic character; but in the strong and plethoric, they are more sthenic or tetanic. The trunk of the body is writhed to and fro, and the limbs are variously agitated, one arm and hand (most frequently the right) commonly beating the breast repeatedly. The patient often beats her head against the bed or couch, tears her hair, screams, shrieks, laughs, or sobs and cries immoderately. Sometimes the trunk remains stiff, whilst the arms and limbs are tossed in every direction. The muscles of respiration participate in the struggle, and breathing is effected slowly, laboriously or deeply, and spasmodically, often with deep sobs and constriction in the situation of the diaphragm, and occasionally with hiccup. The respiratory efforts are rendered still more laborious by spasm about the throat, pharynx, and glottis, and the patient often applies her hands to her neck and throat, and rubs or strikes the epigastrium, or left side, with the hand: during the struggle, she sometimes bites her arms or hands, or even the bystanders. The abdominal muscles are tense, or irregularly constricted; the belly, especially about the navel, is often drawn inwards, and the sphincters are firmly constricted. The action of the heart is increased with the severity of the convulsions. In some cases, however, it is not much, if at all, accelerated; in others, it is very irregular and unequal; and in all, the veins of the neck are remarkably distended, the carotids beating with more than usual strength. The face is flushed and tumid, or full, particularly in the plethoric; but in delicate females, it is occasionally pale. The temperature is usually reduced, especially in the extremities, at the commencement of the attack; but it is increased as the convulsions proceed, although in the non-plethoric, it sometimes either continues below, or does not rise above, the natural standard.

7. The *duration* of the fit varies from a few minutes to two or three hours. The recovery from it is attended by a flow of tears, or by a fit of laughter, or by an exclamation, and is generally rapid and complete. Sometimes the patient complains of numbness, or partial palsy of a limb, or of headach, or of loss of voice, after a seizure. And when a copious discharge of limpid urine has not ushered in, it often follows, or both precedes and follows, the attack. Exhaustion, with a desire of remaining perfectly quiet, attends the cessation of the convulsions, but the patient is soon restored to her usual state. She usually retains more or less consciousness of what has occurred in the fit, although she wishes to be thought unconscious of all that has taken place. Loss of consciousness may, however, exist when the fit assumes a very severe or an epileptic form, which it sometimes does in plethoric females; but it is not a general symptom of the purely hysterical convulsion, though ascribed to it by CULLEN and many others. Such fits are ready to recur from time to time; and in the intervals, the patient displays much fickleness, or irritability of temper, is capricious, or even experiences fits of laughing or crying, or of both.

8. II. THE MORE SEVERE FORMS OF HYSTERIA vary more in their characters than in their intensity. — In some cases, particularly in the plethoric, and when the attack is consequent upon obstruction or suppression of the catamenia, the fit presents

most of the symptoms of an epileptic seizure. But the accession is not so sudden as in it, and many of the premonitory symptoms of Hysteria are present. The subsequent exhaustion, stupor, or sleep, is also not so great as after a fit of epilepsy, and the patient rarely injures the tongue or foams at the mouth. She is, however, generally deprived of consciousness. The face is tumid and flushed; the trunk presents a tetanic stiffness, whilst the limbs are tossed in every direction; and respiration is so laborious and so obstructed as apparently to threaten dissolution. In some cases, the patient remains for a time seemingly without breathing, the throat and the veins of the neck being remarkably swollen and distended; and the action of the heart, irregular, hurried, or slow, or entirely interrupted for two or three beats. In other instances, she screams, or utters the most disagreeable and unnatural noises, and grinds the teeth. At last the convulsions cease, and after a period of more or less exhaustion, she recovers, often complaining of headach or slight fatigue.

9. In some instances, after a severe fit, or after violent nervous agitation, and great disorder of the circulating and respiratory functions, the patient sinks into a state of coma, or of hysterical apoplexy, depending upon cerebral congestion. In other cases, a complete state of collapse takes place, respiration being hardly observable, and the pulse so weak, slow, and small, as not to be felt at the wrist. The surface and extremities become pale, cold, and inanimate; and the patient continues in this almost lifeless state for a considerable time. Some of the instances of supposed death, in which persons have been said to have nearly escaped being buried alive, have been of this kind. I have seen some instances of this form of hysteria — *hysterical syncope* — so severe as to occasion some alarm, and M. VILLERMAY considers that death may supervene upon it. Extreme cases of this description have been noticed by PLINY, LANCISI, and others; the instance in which VESALIUS began to dissect a body to which life returned on the application of the scalpel, was probably of the same nature. But cases of hysterical coma, or of apoplectic congestion consequent upon the hysterical paroxysm, should not be confounded with these. In hysterical coma, the pulse is but little affected; but in hysterical syncope, it can hardly be felt at the wrist. Upon recovery from these states, especially from the latter, the patient often experiences catchings, spasmodic contractions of the extremities, shudderings, or convulsions of short duration, accompanied by forced or irregular respiration. Sometimes the paroxysm is not only severe, but is attended or followed by a kind of delirium, or by nymphomania of short continuance.

10. In a few instances, especially where hysteria is obviously dependent upon irritation or congestion of the uterus or ovaria, the paroxysms change their character and assume the form of *catalepsy*, *extasy*, or of *somnambulism*, or either of these nervous affections takes the place of the hysterical seizure. I have seen several instances, illustrating the connection of these with the severer forms of hysteria; and in some, the tenderness in a portion of the spinal column, so much insisted on by some recent writers, was detected. When these nervous affections are thus associated, the attack may commence, either as a slight, or as a severe hysterical fit, and pass in a short time into the cataleptic or extatic state, or it may begin in the form of extasy, catalepsy, or somnambulism, and pass into the hysterical convulsion: but I have likewise seen the paroxysm consist of one of these in its pure or unassociated state. Besides these more severe states of the complaint, various symptoms may assume an unusual and distressing prominence; the sense of strangulation in the throat may be so great as to occasion the utmost distress and alarm, and it may be accompanied by inability of utterance, by flatulent distension of the belly, borborygmi, and remarkable undulations throughout the abdomen. Occasionally the slighter and severer forms of the complaint will alternate with each other; and the latter is frequently induced when the former has existed, by powerful mental emotions or sudden impressions. Sometimes the severer fits alternate with loss of voice, — *Aphonia hysterica*; — or with temporary paralysis of certain parts, giving rise to *dysphagia*, or to *ischuria* in some instances; and they may even terminate in *epilepsy*, *mental derangement*, or *fatuity*. In some instances of severe hysteria in the unmarried state, I have observed puerperal mania supervene after marriage, and follow almost each confinement. These states of hysteria occur not merely in different persons, but sometimes in the same person at different times. Females who are liable to, or who have suffered from, the disease, often acquire so much sensibility, or become so susceptible, as to be strongly affected by every impression that occurs suddenly or by surprise.

11. In *the intervals* between the paroxysm, the general health is more or less deranged; but some functions betray more disorder than others. Digestion is impaired, and there is often a craving after indigestible or hurtful articles, as cheese, cucumber, acid fruit, acids, pickles, &c.; or after food at improper hours. Digestion is usually attended by flatulence, borborygmi, lowness of spirits, and proneness to tears. The bowels are commonly costive; but they are sometimes lax or irregular. The tongue is red at the point and edges, and slightly furred or loaded, or somewhat white in the middle and base. The pulse varies, the least emotion or surprise causing great acceleration of it, or palpitations of the heart. The catamenia are seldom regular as to quantity, or the period of appearance. They also often depart from the healthy character, in the various ways described in the article MENSTRUATION. They may moreover be delayed, retained, suppressed, too frequent, excessive; or they may be painful, difficult, and attended by various phenomena, referrible to morbid conditions of the uterus or of the ovaria. They may also be preceded or followed by leucorrhœa. So much is the health of hysterical females disordered, and so intimate a connection often exists between such disorder and the hysterical paroxysm, that the latter, especially in its slighter forms, seems merely an aggravation, or an exacerbation, of the more or less continued complaint, or as an increased state of the nervous symptoms.

12. In those cases, which are more obviously dependent upon uterine irritation or vascular determination to the sexual organs, irregular or painful menstruation is generally observed, and the discharge is preceded or attended by pain in

the back, loins, or thighs, or in the sacrum and hypogastrium, with forcing or bearing down, and sometimes by tenderness upon pressure above the pubis. Leucorrhœa is usually present, and sometimes also *dysuria*, or even *stranguria*, although not always mentioned or admitted by the patient. The menses may be very irregular, — at one time excessive, and at another, scanty; — now too frequent, and afterwards disappearing for months. The hysterical paroxysm is often connected with the approach or presence of the catamenia; but it is also often brought on at other times by mental emotions or surprise, and by fatigue, and in some instances it is characterised by signs of an unusual increase of the sexual appetite, amounting in some cases to temporary nymphomania, and constituting the *Hysteria libidinosa* of nosologists.

13. III. THE IRREGULAR AND ANOMALOUS STATES OF HYSTERIA are so diversified that a full account of them can hardly be comprised in the limits of this article. As well as the more fully developed affection they frequently depend upon excitement of the sexual nerves by feelings connected with the instinctive affections and appetites, or upon local irritation of the uterine system. In either case, the one acts upon the other—the mental excitement upon the organic functions, and the local irritation upon the mind; and brings within the range of its morbid influence various parts of the nervous circle; the altered sensibility attendant upon the local affection being manifested, not only in the primary seat of disturbance, but also in other parts, with which there is the most intimate sympathy in particular cases, or which, owing to their naturally exalted state of sensibility, most readily participate in the original affection. Granting that the nerves supplying the uterus, the ovaria, and the more external parts of generation, are in a state of morbid irritation — a state which the conditions and functions of those parts, as well as the symptoms, render extremely probable, — the influence extended to other parts of the economy, particularly in susceptible or delicate persons, may be readily inferred. The relations of these nerves to those supplying the respiratory, circulating, and digestive organs; the circumstance of their being a part of the same system; the effects which they produce, both directly and indirectly, upon the circulation in the brain; and their intimate connection with the nerves of sense and of the spinal axis, will serve to explain many of the phenomena, and to account for the multiplied mutations, observed in hysterical affections. When a disposition to irritation or morbid excitement exists in the uterine nerves, those emotions or feelings which have an intimate relation to sexual function, will often be sufficient to rouse this irritation, and to bring in its train certain of the various morbid manifestations generally associated with it, and constituting its more outward and evident phenomena. The intimate connection existing mutually between certain mental emotions and uterine disturbance, whether the mental or the organic sensibility be first excited, and the close association of both with the more prominent symptoms of hysteria, are so fully established, and are so important in a practical point of view, that they should never be overlooked when affections of an anomalous, an irregular, or Protean form, occur in females from the period of puberty to the decline of life. Many of the affections during this period of female existence not only proceed from the source here stated, and are truly hysterical in their pathological relations, but also simulate other maladies of a more serious nature, and therefore require to be accurately recognised in practice. They, moreover, do not only occur in different cases, but sometimes also several of them may appear in succession in the same person, or two or more of them may exist at the same time, thereby increasing the difficulty of diagnosis.

14. *A.—Altered sensibility, or pain of a truly hysterical nature,* is a frequent occurrence, and in some cases may be mistaken for inflammation of a subjacent or adjoining viscus. The situations in which hysterical pains are most frequently felt, are — *a.* The head, often attended with the clavus hystericus; — *b.* Below the left mamma, or at the margins of the ribs; — *c.* In the region of the stomach and spleen; — *d.* In the course of the descending colon, and in the left iliac region; — *e.* Above the pubis; — *f.* In various other parts of the abdomen, or in the abdomen generally; — *g.* In the region of the kidneys, sometimes extending in the course of the ureters; — *h.* In one or more of the lower dorsal or lumbar vertebræ; — *i.* In the sacrum; — *k.* In the hip, or knee joint. Although these are the more frequent situations, pain may be felt so seriously in others, as to alarm the patient, as in the pharynx and larynx, in one or both mammæ, or in the region of the liver. —

15. *a.* Headach, with or without the *clavus hystericus*, generally limited in extent, especially to the forehead, is a frequent circumstance in both the regular and anomalous forms of hysteria; but I must refer the reader to what I have stated respecting it in the article HEADACH (§ 10.).

16. *b. Pain below the left mamma, and above the margin of the left ribs,* is a very frequent occurrence. It may continue for weeks, or even for months with little intermission. It is very circumscribed, is seldom attended with cough, but frequently with palpitation of the heart, and with increased sensitiveness to the impulse of this organ. It is sometimes, although not necessarily, increased by a forced inspiration, and by external pressure. The precise source of this pain cannot be stated with certainty. Dr. ADDISON examined the body of a young woman who had this pain for a considerable time in an aggravated degree, and who died suddenly in a fit. The colon, spleen, heart, and stomach were unaltered, but the cardiac orifice of the stomach was surrounded by a ring of red injected vessels.— Pain in these situations depending upon imperfectly developed hysteria is frequently mistaken for *pleuritis*. The absence, however, of cough, the quiet state of the pulse, particularly when the patient is in the recumbent posture, the versatility and mutability of many of the symptoms, the variability of the patient's mental motions, the existence of disordered catamenia, and especially the absence of the stethoscopic signs of the inflammatory disease, will be sufficient to indicate the nature of the affection. When this pain is attended with palpitations or with morbid sensitiveness of the heart's impulse, and especially if these alternate, or are connected with leipothymia or syncope, *pericarditis* or organic *disease of the heart* may be erroneously suspected by both the patient and the practitioner. But a careful examination into the rational symptoms, comparing

them with the signs evinced by percussion and auscultation, the occasional appearance of decidedly hysteric symptoms, as borborygmi, clangor intestinorum, the globus hystericus, uterine disturbance, and the state of the mind, will here disclose the nature of the disease. In this class of cases, there is also more or less disorder of the digestive organs, and in some, tenderness upon pressure of some of the dorsal vertebræ (§ 23.).

17. *c. Pain in the regions of the stomach and spleen* is another frequent manifestation of hysterical disorder, and is often so intense in the former that the patient screams, leans forward, and expresses the utmost agony. It generally comes on suddenly, and lasts from a few minutes to an hour or more. It is increased by pressure, although not very materially, and the pulse is not much affected. This pain may exist without any nausea or retching; but the bowels are usually costive or irregular. It is sometimes accompanied with a sense of heat or irritation in the pharynx, or is followed by a burning sensation at the epigastrium. There seems to be a very intimate sympathy between the *spleen* and the uterus; irritation of the latter exciting the sensibility and organic contractility of the former in such a manner, as to occasion a belief that it is actually the seat of inflammatory action. The pain felt in the region of the spleen in hysterical cases is never so severe as that which is strictly referrible to the stomach, and pressure is endured much better in the former than in the latter, and often even gives relief. In all such cases, there is no swelling present as in *splenitis*, for which they may be mistaken; but attention to the history of the case, and the good effects of tonic and antispasmodic treatment, will remove any difficulty as to diagnosis, particularly if the functions of the uterus receive due attention.

18. *d. Pain in the course of the descending colon, and in the left iliac region*, may be the only or principal complaint in irregular hysteria. It generally also attends other forms of the disease, and is most frequently seated in the region of the sigmoid flexure, and is attended and aggravated by flatus, which causes a rumbling noise, followed by the globus hystericus, and occasionally by other nervous symptoms. In some instances, the connection of this pain with uterine disorder is very obvious; in others, it is much less so. It is generally independent of disorder of the bowels, although irregularity of them is very frequently observed. That it is purely nervous, is proved by the symptoms, and by the effects of remedies.

19. *e. Tympanitic distention of the intestines* is not an uncommon symptom in hysterical females. Sir B. Brodie states that it has been mistaken for ovarian dropsy, and that the majority of cases of this disease supposed to be cured by iodine and other remedies have been of this nature. I was the first to employ, and to recommend the use of iodine in ovarian dropsy, and I have derived great benefit from it in several cases; but I cannot see how these affections can be confounded with each other, as the diagnosis is remarkably easy. The absence of fluctuation, and the tympanitic sound produced by percussion, sufficiently indicate the cause of distention. It is only when flatus accumulates about the sigmoid flexure of the colon or in the cæcum that there is any resemblance to ovarian dropsy; but other regions, or the abdomen generally, may be distended by flatus, so as to occasion much pain, to impede respiration, and even to disorder the heart's action.

20. *f. Pain above the pubis* is sometimes complained of, but is rarely the only, or even the principal complaint. It is usually attended by more or less tenderness on pressure, and fulness in this situation, with disorder of the excretion of urine. It is generally associated with colicky pains in the abdomen, or in the loins, sacrum, or adjoining parts. It seems to depend upon congestion of the uterus, as it is frequently relieved by local depletion, and by the increase and regular return of the catamenia, which are commonly irregular or scanty. Pain, however, in this situation may attend an excessive discharge, as well as certain forms of leucorrhea. When it accompanies the former, it depends upon irritation, and is more decidedly nervous, unless in very plethoric females, in whom an excessive discharge proceeds from active determination of blood to the uterine system. In some cases of this kind, also, the digestive organs and the functions of the kidneys are much disordered.

21. *g. Irregular hysteria may be manifested by pain in various parts of the abdomen, or in the abdomen generally*, especially about the period of the catamenia, and when they are difficult or scanty. The pain often assumes a colicky character — the *Colica hysterica* of various authors, — and shifts its situation. When it extends over the abdomen, it is sometimes accompanied with excessive tenderness, and great inflation of the bowels. It may then be mistaken for *peritonitis*. Attention, however, to the pulse, the uterine discharges, to the fæcal and urinary excretions, and to the manner and state of the patient's feelings, will assist the diagnosis. In this form of hysterical affection, a marked incongruity will be observed between certain symptoms: greater pain and tenderness will be felt than the pulse, the tongue, and the evacuations should indicate; the most urgent symptoms will suddenly disappear, and as suddenly return; the mind will be variable and susceptible, and some unequivocal hysterical symptom will often arise. The pain and tenderness will frequently shift their situation; the urine will be natural, or pale and copious, instead of being scanty and high-coloured as in peritonitis; and the appearance of the countenance and the postures of the patient will be very different from those observed in inflammations seated in the abdominal cavity. The existence of some derangement in the periods, continuance, quantity, and quality of the uterine discharge, or of pain and difficulty of its accession, or of leucorrhœa, will also tend to confirm the diagnosis.

22. *h. Pain in the region of the kidneys* sometimes extending in the course of the ureters, and even to the urinary bladder, is occasionally the principal affection in hysterical patients. This pain is generally severe and sudden in its attack. When it extends to the bladder, dysuria is often present. This symptom is liable to be referred to inflammation of the kidneys: but here also attention to the existence of uterine disturbance; the marked incongruity of symptoms, particularly between the state of the pulse, the secretions, and evacuations on the one hand, and the pain on the other; the frequent shiftings, the sudden accession, and the as sudden cessation of the pain; and the absence of numb-

ness in the thighs, of vomiting, and of symptomatic fever, will point out the nature of the affection.

23. *i. Pain in the dorsal or lumbar vertebræ,* with tenderness upon pressure of the spinous processes, is often complained of by females of a delicate constitution; and, although it may exist independently of hysteria, yet it is frequently associated either with it, or with uterine irritation. Pain in any of these situations is often also connected with neuralgic affections in various parts of the body, especially in the mammary and intercostal nerves, and in the nerves of the lower extremities, as well as with certain affections of the joints, about to be mentioned. Much diversity of opinion exists as to the nature of the pain and tenderness complained of in the spine, and as to its relation to hysteria and to uterine disorder. It cannot be doubted, that it is frequently connected with one or the other, or with both, and that it may exist independently of either. It is also obvious that, although uterine irritation is often accompanied with hysteria, or with pain and tenderness in the spine, or with both, yet it may be present without either. This affection of the spine has been imputed to inflammatory action in the spinal cord or its membranes, or in some of the adjoining structures; but the accompanying symptoms, the duration of the affection, and the effects of treatment do not warrant this inference as respects at least the majority of cases. It has therefore been attributed to congestion, or to that very indefinite state, to which the term irritation has been applied; but the evidence as to the existence of either of these is entirely of a negative kind. It is probable, however, that the uterine disorder, or the morbid state of the uterine nerves, is propagated by the sympathetic system to the roots of the spinal nerves, and that the sensibility of these last is thereby modified, either in this situation or in one or more of their ramifications. Here, as in many other cases, the primary affection of the ganglionic nerves may not be attended by any painful feeling, although it may induce pain in the voluntary nerves, which it consecutively implicates. From this it will appear, that I ascribe the tenderness and pain in the dorsal or lumbar spine, sometimes associated with hysteria, as well as the painful or neuralgic affections, the tetanic and convulsive actions of the voluntary muscles, &c., to irritation or excitement propagated from the uterine nerves by means of the sympathetic to the roots of the spinal nerves, and to the spinal cord itself. But I at the same time admit that more or less of congestion, or of otherwise disordered circulation in the cord and its membranes may sometimes be also thus produced, giving rise to various paralytic or anomalous symptoms sometimes associated with those already mentioned.

24. Hysterical affections, in which the symptoms are referred to the spine, are sometimes mistaken for ulceration of the intervertebral cartilages and bodies of the vertebræ. Sir B. Brodie has seen numerous instances of young ladies being condemned to the horizontal posture, and to the torture of caustic issues and setons for successive years, whom air, exercise, and cheerful occupations, would probably have cured in a few months. (*On Local Nervous Affections, &c.* p. 46.) Similar instances have occurred to myself, and are familiar to most physicians. When the pain is first complained of in the spine, an attentive examination is often necessary to a positive diagnosis. When it is truly hysterical, it is seldom confined to a single spot, and it often shifts its place. The tenderness of the part is peculiar, and the patient often flinches more when the skin is slightly pinched, than when pressure is made on the vertebræ. The pain is even severer than in real vertebral disease, and when spasms are present they often resemble the muscular contractions in *chorea.* Sir B. Brodie observes, that surgeons sometimes apply a hot sponge to the spine, believing that, if the patient complains of pain on its application, this is a proof of the existence of *caries.* I perfectly agree with him in considering that a patient labouring under a nervous pain in the back, will complain of the hot sponge even more than one in whom real disease exists. The history of the case, the appearance of other hysterical symptoms, the state of the catamenia, the aspect of the patient, her age, and other circumstances already noticed (§ 21, 22.) will assist the diagnosis.

25. *k. Pain in the sacrum and os coccygis* depends upon irritation or disorder of the uterus, although the uterine discharge may not be manifestly deranged. It is sometimes associated with pain and tenderness above the pubis (§ 20.). I have met with several cases, in which pain in this situation has been referred to inflammatory action, or to organic lesion, and been greatly aggravated by depletions and a lowering regimen.

26. *l. Painful affections of the joints* are not infrequent in hysterical females. The joints most commonly attacked are the knee joints, but I have also met with it in the hip joint, the ankle, and in the wrist. Sir B. Brodie, whose experience of these complaints has been very extensive, states that "at least four fifths of the females among the higher classes of society, who are supposed to labour under diseases of the joints, labour under hysteria, and nothing else." In such cases, the pain is not generally fixed in any one part, but belongs to the whole limb; and when the symptoms are referred to the hip joint, the patient winces and sometimes screams, when either the hip, or the ilium, or the side even as high as the false ribs, or the thigh or leg, as low as the ankle, is pressed upon. The morbid sensibility is chiefly in the integuments; and if they are slightly pinched or drawn from the subjacent parts, the patient complains more than when the head of the femur is pressed into the acetabulum. The more the patient's attention is directed to the part, the more is the pain increased; but if her attention be directed otherwise, she will hardly complain. There is no wasting of the glutei muscles, nor flattening of the nates, nor painful startings of the limb at night, nor frightful dreams, as in true hip joint disease. Sometimes this hysterical affection is attended by much swelling of the nates, or of the thigh, without leading to abscess, owing to turgidity of the small vessels, and to effusion of the more deep-seated cellular tissue. In a case which I am now attending, there is a defined and circumscribed swelling; but there is not the least fluctuation, redness, nor throbbing. Instead of the wasting of the glutei muscles attending hip-joint disease, there is a bulging of the pelvis posteriorly, at the same time that it is elevated on the affected side. Hence the limb is apparently

shortened, and when the patient stands erect, the heel does not come in contact with the ground. This is owing to the predominant action of certain muscles, and to a long-continued indulgence in an unnatural position.

27. When the affection is referred to the *knee*, it resembles that just described. There is great tenderness, but it extends some distance up the thigh and down the leg, sometimes to the ankle and foot. The morbid sensibility is chiefly in the integuments, and not in the deep-seated structures. The leg is usually kept extended, and not bent as in disease of the knee joint. There is occasionally swelling, but this is rarely very great. In a case, however, that I attended, the swelling was very great, its accession and disappearance being sudden. Sir B. Brodie remarks that this affection may continue without material alteration for weeks, months, or even for years. In the case just now referred to, recovery took place in a few days.

28. In hysterical affections of the joints, the catamenia are usually scanty, suppressed, or otherwise irregular. The extremities are frequently cold, and the affected limb is sometimes cold, and at other times warm; or there are frequent alternations of heat and cold. Occasionally towards evening, the surface of the affected joint is hot to the touch, and the vessels turgid; but there is no throbbing or other indications of the formation of matter. As in many other forms of local hysteria, these affections generally appear during bodily exhaustion, or mental depression: they are often excited by the depressing emotions of mind, and are as often benefited by whatever rouses the mental influence, or leads to bodily exertion.

29. *m. Painful affection of the breast* is sometimes met with in females subject to hysterical disorder, and is always connected with derangement of the uterine system. In some instances, especially in the more prolonged, the pain is attended with hardness and swelling of the gland. This affection is liable to be mistaken for a much more permanent and severe disease of the organ. It has been described by Sir A. Cooper and Sir B. Brodie; but it has been noticed by numerous other writers, in connection with hysteria and uterine disorder, and, in rarer cases, with pain in the course of the spine. The patient shrinks from pressure, and cannot bear even the skin to be slightly pinched. The examination of the part often produces twitches, or motions resembling those of *chorea;* yet, if her attention can be engaged otherwise, neither much pain, nor these motions, will be occasioned. The morbid sensibility frequently extends to the axilla, and down the arm. This affection usually disappears after a treatment judiciously directed to the removal of congestion or irritation of the uterine organs, and to the regulation of their functions.

30. *n. Pain is sometimes complained of in the region of the liver, and at the margin of the right ribs.* — It may be mistaken for chronic *hepatitis*, and there may be some difficulty in forming the diagnosis. I was lately consulted in a case of hysteria, where pain in this situation was a prominent circumstance, and was associated moreover with jaundice. A free use of mercurials had increased the hysterical affection, without benefiting the jaundice. This latter, however, disappeared during the use of the alkaline subcarbonates and taraxacum, with gentle bitters and tonics, and antispasmodics. The history of the case, the state of the uterine functions, the appearances of the tongue and of the alvine evacuations, and the absence of pain at the top of the right shoulder, will readily distinguish this affection from chronic hepatitis. The other circumstances alluded to above (§ 21, 22.) will also assist the diagnosis.

31. *B. Irregular hysteria giving rise to, and simulating various spasmodic affections.* — *a.* Sometimes the respiratory organs are the seat of the spasmodic disorder. Occasionally the attack resembles that of *asthma*, the paroxysm of dyspnœa being preceded or attended with many of the symptoms of the hysterical fit. In other cases the patient is liable to paroxysms of a dry convulsive cough — the *Tussis hysterica* of authors. Not unfrequently the hysterical tendency manifests itself by severe or repeated attacks of *hiccough*, or of *sneezing*, sometimes accompanied by loud exclamations. Occasionally, the spasmodic disorder affects some portion of the digestive tube, or shifts along it, giving rise to *dysphagia*, or to porraceous vomiting, or spasmodic gastrodynia, or to colic — the *colica hysterica* of authors. *Hysterical dysphagia* is sometimes attended by the globus hystericus, borborygmi, and even by a dread of swallowing fluids, or *hysterical hydrophobia. Hysterical gastrodynia* and hysterical colic are frequent attendants upon difficult, scanty, or otherwise disordered menstruation.

32. *b.* Hysteria may manifest itself chiefly by spasm of the voluntary muscles, giving rise to affections resembling *trismus*, *opisthotonos*, or *pleurosthotonos.* It may also occasion certain anomalous convulsions, and a form of *chorea*, which may be termed hysterical, as partaking of many of the characters of both diseases, and occurring about the period of puberty, generally in consequence of disordered menstruation. In all these affections the pulse is soft, and generally quick, particularly when the patient is erect or sitting up; but it becomes much slower, or natural, as to frequency, when she is recumbent. Irregularity of the menstrual discharge, or leucorrhea, and pain in the left side, or in the region of the spleen, and sometimes tenderness or pain in some part of the spine, attend these affections. The same symptoms, circumstances, and peculiarities, already alluded to with reference to painful hysterical affections, (§ 21.), will also serve to point out the nature of those just mentioned.

33. *C. Hysteria sometimes gives rise to various comatose, cataleptic, or soporific states.* — These states may supervene on imperfectly developed hysteria, or be preceded by hysterical symptoms, particularly borborygmi, the globus hystericus, a variable and excited state of mind, by uterine disturbance, or sudden arrest of the catamenia, &c.; and they may be directly occasioned by fright, sudden surprise, by various mental emotions, sexual excitement, or whatever startles or unexpectedly affects the patient. In these cases the irritation, whether mental, cerebral, or uterine, seems to induce congestion of the vessels of the head, or impeded circulation through them. — *a.* The relation of *catalepsy* to uterine or sexual excitement, and consequently to hysteria, has been manifested in most instances. Since the article Catalepsy was written, I have seen two cases of this affection, and in both these, as well as in those noticed in that article, this relation was

evinced. In one of these, the attack was observed by Mr. BYAM and myself from its commencement until its termination.

34. *b. Coma* also occurs in rare instances, and even assumes the form of congestive apoplexy: the patient is insensible, the pulse is regular and full, the respiration is calm or profound, and the face is either natural or flushed. The seizure is usually preceded by indications of hysterical disorder, or of uterine affection; its duration varies from a few to many hours; and unless the patient be injudiciously treated, owing to its being mistaken for apoplexy, it terminates in rapid or sudden recovery of consciousness or voluntary motion, without any paralytic affection. This attack is merely a modification of catalepsy, or it nearly approaches the latter in certain of its states. At the time of writing this article, I was requested by Mr. GRANT, of Thayer Street, to see a female, who suddenly became comatose after evincing hysterical symptoms. He judiciously directed cold applications to the head, and a continuance of these for a few hours restored the patient. — The *soporific* form of the attack, or that in which the patient lies as in a profound sleep, respiration being so low as hardly to be noticed, and the pulse weak and small, is more frequent than the foregoing, and has been noticed by WHYTT, VILLERMAY, CONOLLY, and others.

35. *D. Hysteria may simulate paralytic affections.* — In such cases, there is seldom a fully developed state of hysteria, but merely an occasional manifestation of certain of its symptoms, and a concomitance of uterine disturbance in some one of its forms. In most instances of these, as well as of other irregular hysterical affections, the variable character of the temper and mind, and the exalted sensibility and irritability of the body, are evinced. — *a.* The paralytic form of hysteria is sometimes connected with spasm, inability to move being attributable rather to this, than to loss of power. Occasionally, also, it depends upon a deficient exertion of volition, the patient being capable of moving the limb when excited. This affection may occur in a single limb, or in both; it may even closely imitate *paraplegia*. Sir. B. BRODIE mentions an instance of hysterical paraplegia, which had been improperly treated, before he saw it, by large depletions, &c., and which consequently terminated in sloughing of the nates and in death; the brain and spinal cord were not altered from the healthy state; the thoracic and abdominal viscera were also sound.

36. *b.* When the paralytic state affects internal parts, particularly the digestive canal, it is limited in extent, and conjoined to spasm in its immediate vicinity. It is doubtful, whether or not, the dyspnœa of hysterical subjects may not also depend upon one or other, or rather upon both, of these conditions. — A seemingly paralytic state of the bladder is also met with in young women, especially those who are subject to pains in the loins, pelvis, or hypogastrium; and, like other paralytic affections, is sometimes attended by pain or tenderness in a portion of the spine *Hysterical retention of urine* arises either from temporary paralysis of the muscular coat of the bladder, or from spasm of the neck of this viscus, caused by irritation of adjoining parts. Hysterical females are liable to an excessive secretion of urine from mental emotion; and if imperfectly exerted volition, or other circumstances, allow its accumulation, the bladder soon loses its contractile power, owing to over-distention. — There is every reason to suppose, that many of the most constant and pathognomonic symptoms of hysteria proceed from irregular spasmodic and paralytic states of the muscular coats of the digestive canal, in connection with inflation, propagated from the large bowels to a greater or less extent, and frequently as far as the œsophagus.

37. *c. Aphonia, or loss of voice* is not an uncommon symptom of hysteria. It may occur alone or follow a paroxysm. It is doubtful, however, how far it depends upon deficient muscular power, or upon spasm. It is sometimes associated with hysterical dyspnœa, cough, or the globus hystericus. Occasionally it is accompanied by symptoms indicating chronic laryngitis, or œdema glottidis. In a case of this description, lately under my care, the hysterical character of the affection became developed after the application of leeches.

38. *E. Hysteria may manifest itself chiefly by disorder of the mental emotions and faculties.* — The mental affections connected with hysteria may be referred to one or other of the following: — 1st. To certain states of monomania, amongst which excited desire, amounting in some cases to nymphomania, may be enumerated; — 2d. To *ecstasis* and mental excitement, in some cases of a religious nature, in others of different descriptions; — 3d. To a state of somnambulism; — 4th. To a form of delirium, generally of a lively character, with which various hysterical symptoms are often conjoined; — 5th. To various delusions, generally of a hypochondriacal kind, to which the patient may become subject, or even the victim, owing to the indulgence it may meet with from imprudently kind relatives; and 6th. To a desire to feign various diseases, sometimes of an anomalous or singular form. In all these, the occasional occurrence of hysterical symptoms; complaints of shifting, transitory, or anomalous pains; disorder of the uterine functions; the nervous temperament, and the hysterical state of constitution, will evince the precise nature of the affection.

39. *F.* Irregular or imperfectly developed hysteria not merely assumes one or other of these states, but sometimes presents two or more of them; or the one complaint may succeed the other. Hysteria may even put on certain anomalous appearances, which cannot well be classed or accurately described, but which will be readily recognised by the physician after a careful examination of the uterine functions and of the temperament, habit of body, constitution, occupations, recreations, and modes of living of the patient. Some of these local and simulating complaints, as coma, palsy, delirium, &c., may follow the regularly developed paroxysm in one of the severer forms above described (§ 8—10.); but they as frequently appear as the prominent ailment, and as here mentioned. They may also gradually pass into, or nearly resemble, other nervous or convulsive affections described under the heads of CHOREA, CATALEPSY, CATALEPTIC EXTASY, CONVULSIONS, EPILEPSY, HYPOCHONDRIASIS, &c.

40. IV. HYSTERIA IN MALES? — Numerous writers of great respectability have believed in the occur-

rence of hysteria in males during states of debility. I have never met with a case, however, in which the complaint was unequivocally developed; but I have seen several nervous affections in males of a susceptible and irritable temperament, weakened by disease, or by over-exertion, that have assumed some of the characters of hysteria, particularly in its irregular or undeveloped state. Cases of hypochondriasis and of melancholy in the male, occasionally present somewhat of an hysterical character; thus I have met with an instance of hypochondriasis in a gentleman aged about forty, who complained of painful attacks of priapism, of a feeling of stricture about the throat, with shedding of tears, miserable depression of spirits, &c.; and yet who could readily join in lively and amusing conversation. Such instances serve to show the relation existing between hysteria and hypochondriasis—a circumstance not less deserving attention, than the distinctions between them. Of the facts adduced and alluded to by SYDENHAM, HOFFMANN, WHYTT, FERRIAR, VILLERMAY, GEORGET, and CONOLLY, favouring the opinion as to the occurrence of hysteria in males, the most conclusive is that recorded by Mr. WATSON (*Edin. Med. and Surg. Journ.* vol. xi. p. 303.). A strong man complained of giddiness and headach, and was seized with epileptic convulsions. After some hours, the symptoms returned with alternate laughing and crying, spasms about the throat, and inability to speak, although he was perfectly sensible. Dr. TROTTER states (*Medicina Nautica*, vol. ii.), that hysteric fits occurred in some cases sent to hospital ships, and that they were attended "by violent convulsions, globus, dysphagia, immoderate risibility, weeping and delirium." It is very possible, that unaccustomed continence in the male may, in rare cases, and in the nervous temperament, give rise to seizures of an hysterical nature. I was consulted by a young gentleman, who complained of headach and several of the symptoms of hysteria, after prolonged periods of continence. I recommended him to marry: he adopted my advice. I saw him two or three years afterwards, and he told me he had had no return of the complaint. A similar instance to that adduced by Dr. CONOLLY, and which arose from intense study, occurred to me some years since. I was recently consulted in the case of a young man of the nervous temperament, who had become early addicted to drunkenness, and who relinquished the habit under the guidance of his friends. Soon afterwards, upon the occurrence of a domestic calamity, he was attacked by a nervous complaint, in which it was difficult to determine whether the hypochondriacal or hysterical character predominated.

41. V. COMPLICATED HYSTERIA.—Hysteria may appear, in either its developed or irregular forms, in the course of numerous other diseases. It may occur at the crisis of, or during recovery from, fever or inflammatory diseases; during the progress of, or in early convalescence from, inflammations of the respiratory organs; or in the course of pulmonary consumption. It is sometimes complicated with asthma—*Hysterical Asthma*; and is very generally a symptom of, or associated with, inflammations of the uterus or ovaria, particularly when these take place independently of the puerperal states. It frequently also attends leucorrhœa and structural lesions of these organs. Hysteria may occur during pregnancy; but it is oftener suspended by this state, as well as by lactation, although it sometimes appears a few weeks after delivery. Its frequent connection with irritation of the spinal cord, with functional disorder of the heart, &c., has been already alluded to; and it is often associated with hypochondriasis. It is often also consequent upon derangements of the digestive organs, especially those in which the gastro-intestinal mucus surface is in a state of irritation. It is not infrequently connected with disorder of the urinary organs, the urinary secretion and excretion being affected in various ways, besides that which more usually characterises the hysteric seizure. When hysteria appears in the course of other maladies, it is generally owing to the temperament and constitution of the patient, and to debility or exhaustion of nervous power, from disease or from treatment. Hence its occurrence after excessive or inappropriate depletions, after hæmorrhages, after parturition, and after fevers.

42. When hysteria is complicated with these or other diseases, or when these affect hysterical females, a prolongation of disease, or further complications, and a protraction of convalescence, are frequently produced. Dr. CONOLLY justly remarks, that in the course of a long hysterical disorder, and yet more readily in the course of fever in an hysterical patient, inflammatory action may take place at the origin of previously irritated nerves, or in the brain, or other organs: tenderness of the spine may become excessive; and disordered sensation and impaired power of motion may indicate the existence of something more than mere irritation. These symptoms may disappear as the patient gains strength; but they sometimes become more intense and constant, and assume a more serious form than the shifting, evanescent, or local tenderness and pain, affecting various parts as described above (§ 14.).

43. VI. DURATION AND TERMINATIONS.—*a.* The *duration* of the *paroxysm* of hysteria varies from a few minutes to many hours; but the continuance of the complaint is very uncertain. Hysteria may not again recur after a single seizure, especially if it have been induced by the more powerful causes; but this is seldom the case, for when it has once appeared, there is a predisposition to its return in one or other of its various forms, upon the recurrence of any of the predisposing or exciting causes. Much, however, will depend upon the general health and circumstances of the patient. It may thus re-appear after intervals of various duration; or it may hardly ever be completely absent, in some one or other of its numerous modes, during the greater part of the period between puberty, or the age of twenty, and the complete cessation of the catamenia. It seldom occurs even in those subject to it after this latter epoch: yet I have seen instances of it induced by mental emotion, at a much later period of life. A very large proportion of the ailments of females during the period of uterine activity, however diversified their characters may be, are really hysterical. Hence many females enjoy much better health after this change has been quite completed than they did previously; although about the period of change, their complaints are often aggravated.

44. *b.* The *Terminations* of hysteria are—1st.

In a more or less complete restoration of health. 2d. In some other complaint, into which it may altogether merge and disappear, or with which it may become associated. It rarely or never terminates in death, unless from neglect or improper treatment. — (*a*) Restoration of health depends very much upon the attention paid during treatment to the removal of the causes, to the state of the general health, to the uterine functions, and to associated disorder. — (*b*) Hysteria may pass into epilepsy, or assume various convulsive forms. It may terminate in mania, and more rarely in confirmed insanity, or in mental imbecility. Females who have been subject to hysteria in the unmarried state, especially if it have assumed the fully developed or convulsive form, are more disposed than others to puerperal convulsions and to puerperal mania; although marriage sometimes entirely removes, or ameliorates the complaint. It may also terminate in inflammation of the membranes of the brain, or of the spinal cord; but this does not occur so frequently as some suppose. It occasionally gives rise to inflammation of the uterus, or of the ovaria; but in these cases, the irritation or congestion of these parts, and disorder of the uterine functions, upon which the hysteria depended or was associated, are only more fully developed, or converted into the inflammatory state by it. Although it often deranges the functions of the heart and lungs, it seldom occasions serious diseases of these organs; but it often aggravates pre-existent disorder of them, as well as of the several digestive viscera.

45. VII. Diagnosis.—It is generally easy to distinguish the more fully developed states of hysteria from other affections; yet this is occasionally very difficult; and it is particularly so to distinguish several of the more irregular forms of the complaint from those diseases which they so closely simulate. Of the *diagnosis* of these forms I have made sufficient mention in my descriptions of them. —*a*. Fully formed hysteria may be mistaken for *epilepsy*, and the mistake is the more likely to occur, as the former may pass into the latter, particularly when affecting plethoric persons, or when neglected; but it then usually assumes the uterine form of epilepsy. Pinel, Villermay, and Conolly, have properly insisted on the importance of forming a correct diagnosis between these two maladies, and especially of not imputing epilepsy to a female who is merely hysterical. "It is important to humanity, and to the peace and happiness of families," adds M. Villermay, "that these complaints should be correctly distinguished." Epilepsy is an hereditary disease, is incurable in the majority of instances, and generally weakens the intellects and the understanding — circumstances which cannot be imputed to hysteria.— Sydenham, Tissot, and Villermay advise that not only should the symptoms and mode of attack in both be inquired into, but also the causes which occasioned the seizure: yet too much reliance should not be placed upon these in the formation of a diagnosis. The most frequent causes of *hysteria* are, the emotions of love and jealousy, voluntary or compelled continence, longings after ardently desired objects, or unsated desire, disorders of menstruation, &c. (§ 54.); — those of *epilepsy*, on the other hand, are hereditary predisposition, fright, terror, &c. (See art. Epilepsy, § 19—24.)

46. In *epilepsy*, the seizure is sudden or instantaneous; the patient often utters a loud cry, falls violently to the ground, froths at the mouth, protrudes the tongue, which is generally injured by the teeth, and is altogether unconscious. The eyes are distorted, the muscles of the face violently convulsed, and the pupils are insensible to light. There are generally no precursory symptoms, and there is no sensation of globus hystericus. The epileptic attack terminates in sopor, or a heavy sleep, from which the patient awakens exhausted, complaining of headach and depression. In *hysteria*, on the other hand, the seizure is more gradual; is generally preceded or attended by the globus; neither frothing at the mouth, nor protrusion of the tongue, nor distortions of the face and eyes characterising it. The hysteric patient retains her consciousness, or remembers what has passed during the paroxysm; and although she laughs and weeps alternately, the muscles of the face are not otherwise convulsed. At the termination of the fit, there is often a tendency to sleep, or rather a desire to remain quiet; but there is no sopor or heavy sleep, unless in the comparatively rare form of hysterical coma. There are always borborygmi, pain in the left side, and a copious flow of urine. M. Georget attaches most importance to the absence of the precursory symptoms observed in hysteria, the complete loss of consciousness, and the distortion of the mouth, protrusion of the tongue, and state of the eyes, in determining the existence of epilepsy. When hysteria is about to pass into epilepsy, distortion of the eyes and of the muscles of the face is the surest indication of the transition; and when to this, frothing at the mouth, injury of the tongue, and complete loss of consciousness are added, the epileptic character is fully developed. Numerous other circumstances connected with the history of the case, and the occurrence of the attack, already stated in the description of both diseases, will assist the diagnosis. When a convulsive paroxysm occurs in males, there can be rarely any doubt as to its nature; but when it appears in females, an attentive inquiry into its peculiarities, and into the state of the uterine functions, is especially requisite; for, although it may be hysterical, it may pass into the epileptic form, or it may present a mixed character, but attention to the pathognomonic symptoms just stated, will readily determine the nature of the seizure.

47. *b*. Although *hypochondriasis* and hysteria are distinct diseases, yet they frequently approximate each other, or are even associated in females; indeed, most hysterical females may be said to be hypochondriacal, especially if hysteria has become habitual or confirmed. Dr. Cullen remarks, that the two diseases have some symptoms in common; but they are for the most part considerably different. Spasmodic disorder is rare in the one, but frequent unto a great degree in the other. Persons liable to hysteria are sometimes affected at the same time with dyspepsia: they are often, however, entirely free from it; but this never happens to those subject to hypochondriasis. These complaints occur mostly in different temperaments, ages, and sexes; a circumstance requiring no illustration. The association of them in the female, and perhaps in rare instances in the male, as in the cases above alluded to (§ 40.), is of too much importance to be overlooked. Considering how

much the several parts of the body are connected, and how much the several functions depend upon each other, we cannot wonder that their morbid affections should often be mixed, or insensibly pass, the one into the other; the effect of this is indeed that there are no universal distinctions, and that in a few cases only are there exact limits between analogous or similar diseases. Accurate observation and precise description do much in extricating us from this confusion; but in some cases still, we must remain in doubt and in difficulty. Yet even in these, it will matter but little as to what name we may use, so long as we recognize and estimate with accuracy the nature, extent, and relations of the morbid condition.*

48. VIII. CAUSES.—i. *Predisposing.*—Hysteria may be said to be almost peculiar to the *female* sex; for the instances of its appearance in the male are so rare, and so problematical, as respects its fully developed and convulsive states, as hardly to be taken into account. — *a.* The *age* at which females are most liable to it is from fifteen to fifty; and especially from twenty to thirty, and again from forty-two to forty-eight. It sometimes does not occur until the latter epoch; but it rarely recurs at a later period of life. Hysteria is very seldom observed before puberty; but considering that menstruation commences in some cases, particularly in young ladies in boarding-schools, as early as the tenth and eleventh years, the appearance of this complaint, in some one or other of its forms equally early, cannot be a matter of surprise. — *Temperament* and *diathesis* evidently predispose to hysteria;— nervous, sanguineo-nervous, and irritable temperaments, and persons of a lax, weak, or delicate, impressible and soft habit of body are most subject to it. As this state of constitution is derived from the parents, the opinion of HOFFMANN, FRANK, and others, as to its occasional dependence on hereditary predisposition, cannot be disputed. The children of debilitated, exhausted, or aged parents, and those who are of an impaired constitution, either originally or from early management and education, are most likely to be subject to this disorder. — A plethoric *habit* of body, joined to relaxation or deficient tone, predisposes to the more developed or convulsive states; and a thin or spare habit, associated with delicacy of conformation and susceptibility of the nervous system; to the more irregular forms.

49. *b.* There is perhaps no other malady, which depends so much as this upon the *management* of childhood, and on the moral and physical *education* of early life. A luxurious and delicate mode of living, and of rearing; a neglect of whatever promotes the powers of the constitution, especially of suitable exercise in the open air, and of early hours as to sleeping and rising; an over-refined mode of education, and the excitement of the imagination and of the emotions, to the neglect of the intellectual powers and moral sentiments; too great devotion to music, and the perusal of exciting novels; the various means by which the feelings are awakened, and acute sensibility is promoted, whilst every manifestation of either is carefully concealed; and studied endeavours to dissemble desires which struggle to be expressed, — all serve, especially at a period when the powers of mind, and the conformation of the body are approaching development, to produce that state of the nervous system, of which hysteria is one of the most frequent indications. About the period of puberty in females, various circumstances connected with their education tend to weaken their constitution, to excite their emotions and desires, and to cultivate their imaginative and more artificial faculties, at the expence of their reasoning and moral powers Whenever numbers associate previous to, or about the period of puberty, and especially where several use the same sleeping apartment, and are submitted to a luxurious and over-refined mode of education, some will manifest a precocious development of both mind and body; but in proportion to precocity will tone and energy be deficient, and susceptibility and sensibility increased. In these circumstances also, organic sensibility, particularly as relates to the uterine system, often assumes a predominance powerfully predisposing to hysterical affections. There can be no question, although the subject has been but rarely approached by British medical writers, that indulgence in solitary vices and sexual excitements, is not an infrequent cause of this, as well as of other disorders. Numerous writers have insisted upon the propriety of giving due consideration to this source of mischief, as well as to the ennui and chagrin attending celibacy and continence. I agree with Dr. CONOLLY, in believing that English practitioners pay perhaps too little attention to these and other related circumstances; and that, in a country where the passions and emotions are so carefully suppressed, or concealed, they sometimes seem to forget their silent operation on the frame, and charge the medical writers of other countries with being somewhat fanciful and extravagant.

50. *c.* Besides the above, there are various circumstances connected with the *social state,* that tend to develope these conditions of the uterine organs and nervous system, in which hysterical disorder originates. M. GEORGET remarks, that the progressive steps of life, as youth passes away, are sources of painful moral affections, especially to the frivolous, the vain, and the unmarried of the sex. These affections increase the susceptibility of the nervous system, and, with numerous other circumstances yet to be mentioned, dispose to the nervous disorders of the more advanced epochs of life. There can be no doubt, that pampered modes of living; an early or habitual indulgence of temper, or of the emotions and desires; the use of wines and liqueurs, even within what may appear the bounds of moderation; late hours, and late rising; insufficient modes of exercise, or the want of it, and of pure air; neglect of the requisite exposure to light and

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* M. BRACHET, in distinguishing between hysteria and hypochondriasis, says that the former is a spasmodic affection of the cerebral nervous system, to which he has given the name of *cerebral neurospasm* (*neurospasmie cérébrale*), and that the latter is a disorder, a vitiation, an aberration of the two nervous systems, which he denominates a *cerebro-ganglial neurotaxy* (*neurotaxie cérébro-ganglionaire*). Thence he infers that there can be no identity as to seat or affection between these two diseases; for the one is a spasmodic affection of the cerebral system only, and the other is an ataxy of the two nervous systems. He moreover states that there is no farther analogy between them, than the participation of the cerebral nervous system in the two maladies; but that, in hypochondriasis, the ganglial system is equally compromised. Hence, 1st. They are not identical affections: — 2d. They differ in their seat and nature; the phenomena in the one being spasmodic; in the other, vitiation of function.

sunshine; and sedentary occupations, particularly in over-heated and crowded apartments or factories, more or less predispose the female constitution to this affection. Some writers believe that the use of tea and coffee has a similar effect; it is possible that the former, especially green tea, taken too frequently or in excess, will weaken the nervous system; and that the latter will sometimes excite the uterine organs. The influence of *climate* is not very manifest; temperate and changeable regions certainly furnish more numerous instances of nervous disorder in females, than very warm or very cold countries; but as much is probably owing to the state of *manners* and *society* in the former, as to climate. Even *dress* has some effect in the production of hysteria; inordinate compression of the waist by stays not only weakens and displaces the digestive organs, but favours local determinations and congestions, and deranges the uterine functions.

51. *d. Previous disorder* more frequently predisposes to hysteria, than other circumstances, for many of those already noticed induce other complaints, before hysteria, in any of its forms, is manifested; and these complaints constitute merely that state of predisposition, which only requires the occasion or exciting cause of its appearance. The various disorders of MENSTRUATION (see that article), determination of blood to, or congestion, or irritation of any of the uterine organs, may exist, and yet no hysterical affection take place. The nervous system also, both ganglial and cerebro-spinal, may be susceptible and morbidly sensible, and yet none of the phenomena constituting hysteria may appear. These, as well as some other morbid states, frequently constitute only the predisposition, which, however, will readily burst into open disease, when one or more of the exciting causes come into operation. Whatever exhausts organic nervous power will increase susceptibility and irritability, and thus constitute that mobility of the system, and disposition to local determinations and congestions, justly insisted upon by Dr. CULLEN, as being connected with the pathology of the complaint. The susceptibility arising from exhaustion by acute disease favours the appearance of hysteria, especially during early convalescence. The approach and presence of the catamenia have also some influence, both as a predisposing and an exciting cause.

52. *Gastro-intestinal disorder*, or irritation, has been justly viewed by numerous writers, as a predisposing cause of hysteria, and particularly insisted upon by BROUSSAIS and his followers. Although this writer has doubtless exaggerated the influence of this morbid condition, and imputed to it phenomena depending chiefly on debility and augmented organic nervous sensibility, yet it is nevertheless often present, associated, however, with other morbid states, as those just named, and with impaired action and flatulent distention of the digestive canal. In some cases also, the gastro-intestinal disorder is almost coeval with, and purely a complication of, the hysterical affection. But it is much more frequently observed, that numerous circumstances tending to disorder the digestive mucous surface, especially errors in diet, as respects both food and drink, and various symptoms indicating impaired or disordered digestion and fæcation, have preceded for a longer or shorter period the development of the hysterical disorder. Still it must be admitted, that the symptoms referred to the alimentary canal, especially impaired function, flatulent distention and borborygmi, and altered sensibility, are greater indications of debility of the organic nervous system, than of inflammatory irritation of the gastro-intestinal mucous membrane. Nor should it be overlooked, that disorder of the uterine organs, seated not merely in the nerves, but affecting also vascular action in these organs, may exist without exciting painful sensations, and yet sympathetically disturb the digestive canal. Thus we perceive the changes produced in the uterine system by impregnation displayed chiefly in the digestive organs and nervous system. Even the errors of diet, and the desire for various improper or indigestible articles of food and drink, which has been attributed to disorder of the alimentary canal, may be actually occasioned by changes originating in the uterine organs. These substances, however, by increasing the disorder of the digestive tube, will aggravate or perpetuate the primary affection of the sexual organs. There can be no doubt, that whatever weakens organic nervous power, as all disorders of the gastro-intestinal viscera necessarily do, will both dispose to, and increase, hysterical complaints.

53. It has been supposed by some writers, that the females of *gouty* parents are more prone than others to hysteria. This may be partly accounted for, by deficiency of constitutional energy derived from the parent, and greater susceptibility of the nervous system, as well as by the circumstances alluded to above (§ 49.).

54. ii. *Exciting Causes.* — Certain of the predisposing causes may of themselves occasion the complaint, when more than usually active, especially disorder of the uterine organs, or of the digestive canal. Excitement of the nerves of the uterus or ovaria, or irritation of them, particularly in connection with any irregularity of menstruation; inflammatory action, of an acute, subacute, or chronic nature, of the vagina, or of these organs; congestion, structural lesion, tumours, polypi, &c., of the uterus, and leucorrhœa, not infrequently occasion hysteria. Although this disorder is very often connected with excitement, or even with inflammatory irritation in the ovaria, yet it is seldom symptomatic of fully developed ovarian dropsy. It is not improbable, that this latter malady proceeds from a state of impaired tone, or is associated with a condition of the organic actions in these parts, incompatible with the production of the hysterical paroxysm. Irritation of the gastro-intestinal mucous membrane, by stimulating or acrid ingesta, particularly such as act upon the colon and rectum, as large doses of aloes, colocynth, &c.; morbid secretions, mucous sordes, and fæcal collections in the large bowels; the irritation of worms, especially of ascarides, in the rectum—the *Hysteria verminosa* of SAUVAGES; the use of stimulating or acrid glysters; and hæmorrhoids, sometimes excite one or other of the forms of the complaint. Excessive discharges and hæmorrhages, particularly prolonged leucorrhœa, diarrhœa, abortions, uterine hæmorrhage, and protracted suckling, on the one hand; and on the other, the suppression of discharges, as of the catamenia, of the lochia, and of leucorrhœa; long or extreme suffering from pain; mental or bodily

fatigue; and even irritation of remote parts, as that connected with cutting the wisdom teeth, occasionally induce a seizure.

55. Mental affections and excitements, especially those which act upon the uterine system in particular, disappointments in love, unreturned and spurned affections, jealousy, anger and other violent emotions; protracted expectation, longings after objects of desire, tragic representations, frights, the sight of objects, disgusting or distressing, or disagreeable from peculiar mental diathesis, and intelligence of a distressing or of an exciting nature, suddenly communicated, are the most common occasions of hysteria, as respects both its first appearance, and its subsequent recurrences. Several of these emotions affect the uterine organs, the affection being afterwards reflected upon the nervous system generally. Premature or physically incongruous marriages; excited, but unsatisfied, desires; celibacy, and veneris desiderium inane, are also not infrequent causes of the complaint. FRANK remarks, that "Cœlibem vitam plures sine noxâ ducere possunt fœminæ, sed vix unam illarum invenies, quæ prope maritum impotentem impune decumbere possit. Idem de uxoribus, a maritis neglectis, valet." — There is no doubt, that the sight of others in the fit will sometimes produce an hysterical seizure. I have myself witnessed this on two or three occasions; and in one of these, two females were attacked from this circumstance. This phenomenon has been imputed to imitation; but it may with equal propriety be assigned to sympathy, to fear, &c. Probably more than one of these feelings are concerned in producing it. Severe mental distresses, or extreme joy, may also occasion some one or other of the forms of the complaint. Immoderate fits of laughing produced by humorous or ridiculous occurrences, or crying caused by vexation or contrarieties, may also pass into the hysterical paroxysm. I have no doubt of the fit being often renewed at pleasure, almost as readily as tears may be shed, by recalling or adverting to various feelings, emotions, or circumstances; and I have even seen instances which have convinced me of the fact. Electrical and warm states of the air, and sudden vicissitudes of temperature, have been supposed sufficient to produce a seizure. The influence of spirituous or vinous potations, of stimulating diuretics, and of substances which excite or irritate the urinary bladder, in the production of the complaint, is much less doubtful than that of atmospheric temperature; but the close, warm, and impure air of crowded rooms and assemblies, particularly in connection with excited feelings or contrarieties, very often occasions an attack, especially in those who have previously experienced it. A similar effect is in rarer instances produced by various odours, especially in peculiar idiosyncracies. HIGHMORE states that the fit has been often induced by the odour of musk.

56. IX. PATHOLOGY. — The nature of hysteria may be in a great measure inferred from what has already been stated respecting its symptoms and causes; yet something more explicit still must be advanced on this subject. As simple and pure hysteria is rarely or almost never fatal, and as we therefore have hardly ever an opportunity of examining the state of the principal viscera of patients who had been subject to this complaint, unless they have died of some intercurrent or associated malady, so proofs have been wanting in support of any of the doctrines proposed as to its nature, and a very wide scope allowed for vague hypothesis. The ancients and many of the moderns referred hysteria to the womb; and hence the origin of the name. The ancients, however, ascribed properties, powers, functions, and motions to the uterus, which modern knowledge has shown to be erroneous; yet I am disposed to believe that this organ, influenced as it most probably is by the nervous and vascular states of the ovaria, performs a very important part in the œconomy; and that this is not confined to alterations merely of its organic sensibility, but that it extends frequently to its contractility, and to several related organs.

57. Some recent writers have ascribed hysteria to irritation in the uterus, in the intestines, in the brain, or even in other internal viscera, occurring in delicate, nervous, or susceptible persons. Dr. CONOLLY remarks, that in all cases of hysteria there is a disordered state of some part or the whole of the nervous system; and that, although this state may be, and very frequently is, induced by uterine irritation, it no less evidently arises, in other cases, from causes productive of irritation in other parts of the body, and also from causes acting directly upon the mind. That more or less susceptibility, original or acquired, characterises the state of the nervous system in hysterical persons will not be disputed; yet even in such persons, the usual exciting causes, or irritations of different viscera, will not occasion true hysterical symptoms, unless they previously affect the state of organic nervous influence, or of circulation, in the sexual organs.

58. WILLIS ascribed hysteria to disorder of the brain, and M. GEORGET has recently adopted the same view, which has been most ably and satisfactorily overthrown by M. FOVILLE. Still more recently Mr. TATE has contended that hysteria arises from a morbid state of the spinal cord, connected with disorder of the womb; but, as I have already remarked, this "morbid state" is but a vague generic term, and that, most probably, even when it is most prominent, more of altered sensibility than of vascular or structural lesion, of this part of the nervous system constitutes its essence. However this may be, attentive observation of the morbid phenomena, especially at their commencement, will show that the spinal affection is merely a consecutive and contingent disorder, and one by no means generally, or even very frequently, observed. This want of precision in the use of terms, and in the ideas relating to the pathology of hysteria has been surpassed by M. ANDRAL, when he says, "As to my opinion respecting the seat of hysteria, I repeat, that it is a nervous complaint, and that its seat is the nervous system!"

59. Although the uterus and its appendages have been viewed as the chief source of hysteria, both by the ancients, and by most of the moderns, yet some difference of opinion exists as to the nature of this primary affection. PINEL, VILLERMAY, LOBSTEIN, and FOVILLE consider that it is entirely nervous, or is an excited state of the nerves supplying the organs of generation. Other writers, as ADDISON, &c., who have adopted the term uterine irritation, seem to ascribe to this

term a similar meaning to that which the above authors have wished to convey; although they contend, that, in connection with this state, the uterine functions are very often disordered. M. PUJOL, on the other hand, infers the existence of chronic inflammatory action of the uterus, as the immediate cause of the complaint. Inflammatory action in its various grades, from simple erethysm upwards to the most acute vascular change, may sometimes be a complication or cause of hysteria; but there is no necessary dependence of the one upon the other; for we often meet with *metritis*, without hysterical symptoms, and still more frequently with fully developed hysteria, without any evidence of metritis. Yet it should not be overlooked that the former is often symptomatic of, or complicated with, the latter.

60. When we consider the number and importance of the nerves of the female organs of generation; the connections existing between them and the nerves supplying the kidneys, the urinary bladder, and the intestinal canal on the one hand, and the spinal and sacral nerves on the other; and the fact that these nerves are small and apparently few in girls, large and numerous during the epoch of uterine activity, and very small in old women; the sympathetic effects of irritation, excitement, or of erethysm of them will be more readily recognised, and the relation of these sympathies to their source made more obvious. Attentive observation of the causes of hysteria, and of their more immediate effects upon the generative system, and a knowledge of the sensations of the patient with reference to the origin and course of this ailment, will prove, that the old opinion as to its source is correct. That the primary affection is seated in the nerves of the generative organs, and that it consists chiefly of excitement, erethysm, or irritation, sometimes, however, associated with congestion or vascular determination to the uterus, or with disorder of the catamenia, are shown by the circumstances in which it is observed, and the fact that it never appears until these nerves have approached their full development, nor after their principal functions have ceased. GEORGET, however, contends in opposition to this opinion, that organic lesions of the uterine organs are very common in females, who have never had hysteria; and that the more serious changes, as cancer uteri, uterine polypi, ovarian dropsy, &c., are seldom accompanied with this complaint. But the most of these maladies do not appear during the epoch, in which hysteria is most common. As long as the uterine functions and sympathies are active, hysteria will occur. Hence its not infrequent connection with metritis and other uterine diseases, during the prime of life; but when these functions and sympathies are exhausted or greatly enfeebled, as in most of the dangerous maladies and organic lesions of the uterus and ovaria, as well as in advanced life, hysteria will not be developed. The generative nerves have then become incapable of experiencing that state, and of exerting that influence upon the nerves related to them, which are requisite to the production of hysterical phenomena. As M. FOVILLE has justly observed, we do not find sexual ardour amongst the symptoms of malignant alterations of the testes, or of hydatids in the spermatic cord, &c. Hysteria does not occur in aged females, for the very same reason that menstruation and pregnancy do not take place in them. The belief that hysteria may affect males has been adduced against its uterine origin; but the fact of true or unequivocal hysteria having been met with in males, needs further confirmation; or rather the nervous affections, resembling some states of hysteria, noticed in this sex, require a closer observation than they have hitherto received. I will not, however, deny, that irritation of the male sexual organs will not occasionally produce disorder, in many respects similar to that observed in females in like circumstances, particularly in susceptible and nervous persons.

61. My views, therefore, as to the *pathology of hysteria* are as follows: — *a.* That hysteria arises from the state of the organic nervous influence endowing the generative organs of the female, and that a similar state of the sexual organs of the male very rarely occasions it, and then only in peculiar circumstances; — *b.* That this state of nervous influence nearly approaches to, or consists of, excitement, nervous erethysm or irritation, or is of an active or sthenic kind, as respects the functions of these organs; — *c.* That this is generally attended by vital turgescence of the vessels of the uterine system; and these states, consequently, occur chiefly during the prime of life, or whilst the nerves of generation and the uterine circulation possess their functional energies; — *d.* That these conditions of nervous influence and circulation in these organs are generally insufficient of themselves to occasion the fully developed complaint; and that, in addition, there are increased sensibility and irritability of the sentient and motive systems, and consequently augmented susceptibility of impressions, from mental or physical causes, arising either from original conformation, or from acquired habit or diathesis; — *e.* That when these states of the generative organs are excited by mental emotions or by other circumstances, the affection is propagated by direct or immediate sympathy, — by the organic nerves, — to the digestive tube and urinary organs on the one hand, and to the cerebro-spinal nervous system on the other; and thus the phenomena constituting the hysterical seizure are developed; — *f.* That the hysterical phenomena, proceeding from *direct sympathy* with the uterine organs, consist chiefly of those referred to the bowels — the borborygmi, globus, &c., and to the urinary organs, as the increased secretion of urine, &c.; — *g.* That the extension of the disorder of the uterine nerves, by means of the ganglial system and its communicating branches, to the roots of the spinal nerves, gives rise to the symptoms depending upon *reflex sympathy* *, especially the convulsions, pains, &c., and the affections of the respiratory organs, throat, head, &c.; — *h.* That the phenomena of the developed states of the disease and of its irregular forms are principally sym-

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* In my APPENDIX *to* M. RICHERAND'S *Elements of Physiology*, published in 1824 and in 1829, I have divided the sympathies into — 1st. The *Reflex*, or those which take place in consequence of irritations conveyed by the nerves to the cerebro-spinal centres, and thence reflected upon motive or sentient parts: — and, 2dly. The *Direct*, or those which proceed more immediately from the seat of primary excitement to other parts, by means chiefly of nervous communication, continuity of membrane, structure, &c. — These views as to sympathy, which are certainly original, were applied to the explanation of the pathology of CHOREA, and its related disorders of CONVULSIONS, EPILEPSY, &c.

pathetic, and of the kind which I was the first to denominate the *reflex* (see *Notes and Appendix to* RICHERAND's *Elements of Physiology*, pp. 34. and 546.); and the same views and pathological explanations given in the articles CHOREA AND RELATED AFFECTIONS (§ 15—17.), CONVULSIONS (§ 46.), EPILEPSY (§ 51.), apply to the different varieties of HYSTERIA; — *i.* That, although hysteria is often connected with deficient or irregular menstruation, yet this function is sometimes excessive, or is occasionally regular, in every respect, in hysterical persons.

62. X. TREATMENT. — There are few diseases less under the control of medical treatment than hysteria; and various circumstances connected with it often occur to render the management of it not only unsatisfactory, but also unpleasant. Patients themselves or their friends readily suppose that relief should quickly follow a recourse to medicine, and conclude, that the proper means have not been employed, when relief is not obtained. They do not consider, — and the fact is generally not sufficiently explained in the proper quarter, and at the proper time, — that the complaint arises from causes which are mostly permanent in their action, or which continue during the treatment, and that in every case the difficulty of removing an effect, whilst the causes are in operation, is very great. The candid physician also readily admits, that the complaint in its various forms is devoid of danger, and this circumstance is believed by many to imply a speedy cure. Several varieties of it also are calculated to excite alarm; and, if they be not soon removed, the knowledge or ability of the physician, under whose care they may have come, is impeached; and some other advice is asked, and often in quarters noted neither for honesty nor ability. If the patient should thus fall into the hands of either the qualified or the unqualified charlatan, the complaint is misrepresented or exaggerated, and alarm is excited. The effect, however, is often beneficial, although it was as little intended as its source was unsuspected. The impression of fear on the mind may put a stop to some of the causes, or may interrupt the succession of morbid sympathies. The patient, moreover, after she has passed from the care of the scientific practitioner, may be subjected to influences of a powerful nature, moral or physical, or both, and experience temporary or some permanent advantages from them; but from whatever source they proceed, or by whomsoever administered, — whether by the medical empiric, or by the spiritual comforter — the modern worker of miracles, — the results are often equally annoying to the duly qualified practitioner. The regular professor of medicine is expected to administer benefit in all cases, and without regard to circumstances. If he fail, and the patient, under very different circumstances and influenced by very different feelings, receive benefit from the manipulations of a charlatan, whose means are more striking or imposing, or more suited to the moral condition of the patient, than those previously employed, the occurrence is made a matter of notoriety, and equally to the disadvantage of the one, as to the credit of the other. The former is expected by the public to cure, and it is considered discreditable for him to fail; the latter is viewed as having made a wonderful discovery, if he succeed but in a single case, and his knowledge is supposed to have come by inspiration, as it could not have been derived from any other source. Another circumstance further serves to counteract the treatment advised by scientific men, particularly in large towns. The patient is capricious, and her friends are often equally unstable. If benefit is not received in a very short time, the advice of some one else is obtained, and before he can be of any service, he also is dismissed, and a third is called in. Thus, from twenty to thirty practitioners may be consulted without one of them having had a sufficient opportunity of fulfilling a single intention of cure. Now, what is the consequence? The patient resorts to some noted or fashionable empiric, who is informed of her long sufferings, and the want of success of the greatest physicians in her case. He is shrewd enough to see at once the state of matters, and to turn them both to his pecuniary advantage and to his credit. He exaggerates the risk, the difficulty, and the consequences of the disease; refuses to undertake the case, unless at his own terms, which he takes care to secure; and he thus also secures the continuance of the patient under his care, and even her confidence, although he should fail in all beside.

63. From the dishonest acts of charlatans, useful lessons may, however, be honestly learnt. When a physician is called to a nervous patient, who has been under the care of other physicians, instead of prescribing at once, and without reference to this circumstance, he should acquaint her or her friends, that probably a sufficient opportunity of affording relief had not been allowed to those who had preceded him; that, as a member of an honourable profession, he expects to be honourably dealt with, and that he will not compromise his reputation by prescribing for the case, unless he be allowed time and opportunity — fully and circumstantially — for its proper treatment. Unless these be conceded, and in a spirit which will promise to secure their due performance, it will be infinitely better to relinquish the case altogether, than to enter upon the treatment of it, with the probability of disappointment. When it is found that the physician thus regards his own reputation, respect and confidence will be accorded to him by the patient and her friends.

64. There are various circumstances in the pathology of hysteria, which require strict attention in the treatment. — 1st. The particular form of the hysterical seizure, whether regular, irregular, or anomalous; — 2d. The condition of the nervous system, particularly with reference to increased sensibility and irritability; — 3d. The excitement, erethysm, vital turgescence, or other disorder of the uterine system, and their influence by *direct* and *reflex sympathy*; — 4th. The states of the vascular system, in connection with these, especially in respect of *plethora*, general or local, or of deficiency of blood; — and, 5th. The functional or other disorder of the digestive canal. Of all these, the most important is the state of uterine function; for unless the symptoms connected with the generative organs be carefully ascertained, as far as is proper to inquire, and the disorder in this quarter be carefully inferred, the treatment will often be unsuccessful; and, even with the utmost exercise of professional acumen, we may fail, more or less, owing to the permanence of the moral and physical causes of the complaint.

65. i. TREATMENT IN THE SEIZURE. — *A.* If the paroxysm be attended by severe *convulsions*, the principal intention is, *to preserve the patient from injuring herself*; the next is, *to shorten its duration.* — *a.* Although her struggles are severe, she generally retains sufficient consciousness and even volition, to avoid danger. Therefore little effort should be made to restrain them, and especially as they have upon the whole a beneficial effect, particularly in equalising the circulation. If, however, the fit assumes an epileptic character, this object should be carefully attended to, and a folded napkin placed between the teeth, if it be required. In all cases, the patient should be removed to an airy apartment, and the clothes loosened around the waist, chest, and neck. — *b.* In order to *shorten the fit*, various means have been recommended, and found more or less serviceable. If the patient is able to swallow fluids, a large cup full of *cold or iced water* may be given and repeated. If the seizure be more severe, or be attended by general or cerebral plethora, the *affusion of cold water* on the head and neck should be resorted to, or cloths wet with it, or with an evaporating lotion, should be placed around the head. If the severity of the spasms, particularly of the muscles of the face and jaws, and of the strangulating sensation arising from the globus, prevents deglutition, *enemata* will be found of great service. The substances which I have found most efficacious, when thus employed, are, the spirits of *turpentine* alone, or with castor or olive oil, *assafœtida*, and *camphor*. An enema of the coldest spring water also puts an instant stop to the convulsions. The spirit of turpentine was recommended by me in 1821 (*Med. and Phys. Journ.* vol. xlvi. p.107.185.), in these cases. From half an ounce to an ounce and a half of it, may be thus administered, with either of the oils just named, in any vehicle, as gruel, milk, broth, &c. As the patient's consciousness is seldom lost in the seizure, the influence of fear in arresting it has been often resorted to, and frequently with complete success. Even mention of the affusion of cold water has put a stop to the fit. Yet instances have occurred in timid persons of great nervous susceptibility, where fear has aggravated the convulsions.

66. *B.* Where there is neither cerebral plethora nor difficult deglutition, the internal use of *diffusible stimulants*, as the preparations of *æther*, of *ammonia*, of *valerian*, of *assafœtida*, &c., have been very generally recommended, and are often useful, combined, according to circumstances, with one another, or with *anodynes*, as *laudanum*, *henbane*, *hydrocyanic acid*, &c.; the smoke of burnt feathers, and the odour of assafœtida, of mint, of the volatile alkali, of aromatic vinegar, &c., are the common domestic means for the removal and prevention of a seizure. Much, however, particularly as respects the *prevention* of the fit, depends upon the patient herself. Most females, subject to the complaint, give way to the current of their feelings, until the paroxysm is developed, although a determined resolution to prevent or suppress it would often prove successful. Diffusible stimulants are not so generally useful in preventing, as in shortening, the attack. The former of these objects is more certainly obtained by a draught of cold water, or by an enema of the same, or by cold applications to the head, than by other means. Dr. CONOLLY states that he has found half a drachm of ipecacuanha prevent the seizure. Any of the other substances already recommended to be used in enemata, for the purpose of shortening the fit, will generally also prevent it.

67. *C.* The more severe or alarming states of the fit, as the comatose, the cataleptic, &c., are most benefited by the affusion of cold water on the head, or by the application of cold lotions in this quarter. Vascular *depletions* are seldom necessary during the fit, even in these cases, unless the attack has followed the suppression of accustomed discharges; or the temperature of the head, and the action of the carotids show the propriety of prescribing them, and even then a moderate bloodletting, or cupping on the nape of the neck, will be sufficient. Warm and rubefacient *pediluvia*, and other *derivatives* from the head, may also be employed in these cases. The means which may be further resorted to will be stated hereafter (§ 71. 75. 97.).

68. ii. GENERAL TREATMENT, PARTICULARLY IN THE INTERVALS. — *A. With reference to the state of the uterine system.* — The female organs of generation may be subject to that state of excitement, erethysm, turgescence, or irritation, which, in susceptible and nervous persons, seems intimately connected with hysteria, without the catamenia being in any way disordered. More commonly, however, this discharge is scanty, difficult, painful, or irregular as to time, quantity, and character. In a few instances it is suppressed, or nearly so; in others it takes place at intervals of two or three months; in some it is too profuse, or much too frequent, and in many it is pale and branniform, or it presents appearances more fully described in the article MENSTRUATION. But all these states are usually accompanied by more or less of altered sensibility, referrible to the uterus or ovaria: there is often pain behind or above the pubis, in the lower part of the sacrum, or in the loins, or in the hips or tops of the thighs; the excretion of urine is disturbed, or too frequent, or attended by slight scalding, &c.; and there is sometimes leucorrhœa, with tenderness of the os uteri on examination, and occasionally an unpleasant sense of heat in the vagina. All these indicate the propriety of having recourse to local depletions; yet, unless the patient be plethoric, or the discharge has been scanty or suppressed, a very copious vascular depletion is often injurious. A moderate *cupping* on the sacrum; or the application of ten or twelve *leeches* to the groins, two or three days before the expected return of each monthly evacuation, or to the hypogastrium, will generally suffice. If the depletion be more liberal, the employment of tonics and of other means to improve the general health must not be neglected.

69. All the symptoms just noticed as indicating irritation of the uterus, are often present, even in the severest form, where there is great constitutional debility, and, in a few instances, where the colour of the surface and of the lips, and the states of the pulse and of the veins, indicate more or less anæmia. In these, even local depletions may be hurtful. The chief dependence must therefore be placed in preventing local excitement or irritation, in the use of cooling *tonics* sometimes in conjunction with *anodynes* and *sedatives*; and in improving the digestive functions and general health, by

suitable diet and regimen. The *sulphates of iron*, of *zinc*, and of *quinine*, are severally of use, in combination with small doses of *camphor*, or of *ipecacuanha*, and with *extract of henbane*, or of *hop*. If these should occasion headach, or increase the tenderness in the vicinity of the uterus, the *infusion* or *decoction of cinchona*, or the *infusion of valerian* with *nitrate of potash*, or *hydrochlorate of ammonia*, or carbonate of *soda*, may be prescribed. When the bowels require to be opened, the *cooling aperients*, as the bitartrate of potash, with the nitrate, and the confection of senna, should be preferred. Moral and physical *quietude*, frequent reclining on a couch, and a digestible and cooling diet, ought also to be enforced. In more plethoric persons, these means are still more requisite than in the preceding; and, instead of chalybeates and tonics, *cooling diaphoretics*, particularly weak camphor mixture, with solution of the acetate of ammonia, nitrate of potash, and spirits of nitric æther, will be often taken with benefit. Wherever uterine turgescence or erethysm is inferred, the treatment must be directed with reference to the states of general or local plethora, and of nervous power, as hereafter insisted upon; and hot spices, exciting articles of food, and stimulating beverages, should be avoided. Heating purgatives and irritating injections ought not to be employed. A separate sleeping apartment should be suggested.

70. When the catamenia are disordered, the treatment must be directed with strict reference to the state of disorder, as explained in the article Menstruation. If they be *excessive* or *too frequent*, *tonics* and *astringents*, with *refrigerants*, and *anodynes* or *narcotics*, are generally requisite; but the predominant use of either of these classes of remedies should depend upon the peculiarities of the case In these cases especially, advantage will accrue from *cold sponging* the loins, abdomen, and hips, every morning with an *astringent lotion*, as with equal parts of rose water, solution of the acetate of ammonia, and vinegar; from the occasional recourse to an *enema of cold water*, particularly when a seizure is threatened, or to *emollient* and *anodyne enemata* on other occasions; and from rest in the horizontal posture. The *cold plunge* or *salt-water bath*, or *shower bath*, will often also be of service. In the other states of disordered menstruation, the treatment should be directed according to the principles stated above (§ 68, 69.).

71. *B. With reference to the state of nervous susceptibility and tone.* — The increased susceptibility of the nervous system generally characteristic of hysteria is frequently associated with more or less debility, and increased irritability of the moving fibre, — or in other words, with mobility of the muscular system; and to this state, whatever may be other morbid conditions, should the treatment be in some measure directed. Yet the means which are the best calculated to correct this state are by no means obvious: for if it be associated with vascular turgescence of the uterine system, or with general plethora, antispasmodics, chalybeates, and other heating tonics may increase the complaint, although they will generally be of service in an opposite state of the vascular system. In general, therefore, the condition of the sensibility and irritability should be combated chiefly by frequent and *regular exercise* in the open air, by *early rising*, by sleeping in large airy apartments, by cold or *salt-water bathing* or the *shower bath*, by cold sponging the surface of the body, by a proper conduct and employment of the mind, and by a correct management of the passions.

72. Dr. Cullen very justly remarks, that *tonics* may be of service when the disease depends upon general debility; but as a plethoric state, especially of the uterus, is more or less joined with hysteria, the frequent or long continued use of them may do harm. They should be confined to cases of pure mobility, particularly with a periodical recurrence of the seizure; and then the selection of them ought to be determined by the peculiarities of the case. In many such, the preparations of *cinchona* or of *valerian*, with the nitrate of potash, or carbonate of soda; the sulphate of *quinine* or of *zinc*, with small doses of *camphor*; the infusion of *bark*, or of *roses*, with one of the *mineral acids*, and the tincture of the *sesquichloride of iron*, will be most serviceable. In some cases, the addition, to either of these medicines, of an *antispasmodic*, as of the compound spirit of *sulphuric æther*, the *tincture* of *valerian*, &c.; and of an *anodyne*, as henbane, hydrocyanic acid, &c., according to the other substances selected, will be further advantageous. When hysteria affects plethoric habits, and is connected with manifest signs of turgescence of the generative organs, *opium* is injurious. But, in other circumstances, it is often of service, particularly when conjoined with camphor, aromatics, or with some of the substances just named, but even then it should only be occasionally employed. When narcotics have not been previously resorted to, the preparations of *hop* will be found useful, if general plethora be not present.

73. *C. With reference to the states of the vascular system.* — The connection of hysteria with vascular plethora, general or local, is often obvious; and has been very judiciously viewed by Dr. Cullen. The usual practice of removing this state by *bloodletting*, he remarks, is often precarious; for sometimes, instead of preventing, it will indirectly induce or increase vascular fulness. Besides, if depletion be carried too far, the complaint may be thereby increased. "Venæsection therefore may either increase the plethora, or induce inanition; and it is only to be used in recent cases, and where there is manifestly a full habit." A *spare diet* and *regular exercise*, particularly in the open air and in the light of day, *early rising*, and *cooling aperients*, are the means upon which the chief reliance ought to be placed in removing this state, and especially as they tend also to strengthen the nervous system, and to prevent local turgescence and irritation. The frequent association also of dyspepsia, and of gastro-intestinal disorder with hysteria, renders this regimen still more necessary. When depletion, however, is indicated by the turgescence, or chronic inflammatory state of the uterine organs, or by impaired or obstructed menstruation, it should be practised in the manner already advised (§ 68.).

74. When the vascular system is deficient, rather than too full, of blood, and when this fluid seems thin or poor (the *Hysteria chlorotica* of Sauvages), then *tonics*, especially the *preparations of iron* and *chalybeate mineral springs*, will be most beneficial; but they should be aided by air and exercise, and the other means already advised for improving nervous energy (§ 71.). The sulphate of iron with the extract of hop, or with the compound galbanum, or with the compound aloetic

pill, according to the states of the bowels and of the catamenia; the compound mixture of iron, &c.; and a moderately nutritious or milk diet, will be eminently beneficial in these cases. If the patient complain of weaknes in the loins and limbs, a large *plaster* of the red oxide of iron, or the aromatic plaster, should be worn on the lumbar region, in addition to the employment of the other means already recommended.

75. *D. With reference to the state of the digestive organs.*—Irritation of the digestive mucous surface, in connection with hysteria (§ 52.), is often most successfully treated by a mild spare diet and moderate exercise in the open air. If the patient be plethoric, or complains of pain or soreness, or of tenderness in the epigastrium, abdomen, or hypogastrium, *local depletions*, particularly the application of leeches on the abdomen, and *cooling diaphoretics*, with external *derivatives*, will be appropriate, as respects both the digestive and the hysterical disorder. If the bowels be costive, the *cooling aperients* (F. 96. 790.), or the preparations of *rhubarb* with *ipecacuanha*, *calcined magnesia*, or *castor oil*, will be useful. If they be relaxed, the *hydrargyrum cum cretâ*, with *rhubarb* and *ipecacuanha*, — or this last with the *extract of hop*, or of *poppy*; and *refrigerants* conjoined with *demulcents*, will be serviceable. In cases of *hysterical colic*, and of irregularity of the bowels in hysterical persons, a frequent recourse to *enemata*, — to those consisting of cold or of emollient fluids, and sometimes of cooling aperients,—will generally prove of great benefit. When the catamenia are at the same time disordered, clysters containing the spirit of turpentine are frequently very useful. The state of the digestive organs often requires *tonics* and *stomachics*; but these remedies may prove too stimulating, unless they be given with *refrigerants* and *antacids*, as with the nitrate of potash, and the carbonate of soda. Aloetic and heating or acrid purgatives, particularly those which excite the rectum and large bowels, are sometimes injurious. The propriety of exhibiting them, even when hysteria is associated with scanty or obstructed catamenia, is occasionally even doubtful, particularly when general or local plethora, or excitement, is present, unless these have been removed by suitable depletions; and then the *compound decoction of aloes*, with a little of the solution of potash, may be preferred. When flatulence is distressing, as it often is, the treatment should altogether depend upon its connection with gastro-intestinal irritation, or with uterine excitement or turgescence. In the former case, the means just stated should be prescribed, aided by the application of a *large rubefacient plaster*, or the compound galbanum or pitch plaster, on the stomach or abdomen. Mint water with calcined magnesia, and an aromatic or carminative, or the infusion of *calumba*, or of *chyrita*, with the carbonate of soda and compound tincture of cardamoms, will generally also be serviceable.

76. iii. Treatment of the Irregular and Complicated States. — The *intentions of cure* in these states of hysteria, are — 1st, *To remove existing disorder in the uterine and digestive organs, or in the cerebro-spinal centres*; — 2dly, *To allay the local affection, by means appropriate to its peculiar characters*;—and, 3dly, *To make a forcible impression, mentally and physically, on the nervous system*, so as to allay the primary nervous affection, and to break the chain of nervous sympathy. These intentions are severally more or less applicable to all the nervous states about to be noticed; but a great difference will be shown to exist in the modes or means of their fulfilment, and in the dependence to be placed upon them individually.

77. *A. The painful affections depending upon this complaint*, or arising from irritation or turgescence of the uterine organs, influencing sympathetically (§ 13.) related or distant parts, require means, in some cases at least, different from, or additional to, those already mentioned.—*a.* The treatment of *Hysterical headach* is fully stated in the article Headach (§ 40.).

78. *b. Pain in the left side of the thorax, simulating pleuritis*, or *pericarditis* (§ 15.), is difficult to remove, especially if there be tenderness in the dorsal portion of the spine, and disorder of the uterine functions. If the catamenia are scanty, and especially if there be more or less vascular plethora, cupping on the loins or sacrum, or the repeated application of leeches to the loins, and cooling or mild purgatives, will be necessary. In other circumstances, and in such cases, after these means have been employed, the effects of *antispasmodics* and of *narcotics* may be tried, especially of camphor or ammonia, with valerian or assafœtida and henbane, &c. If the pain be attended by *palpitations of the heart*, &c., the decoction of senega may be prescribed with mint or orange-flower water, carbonate of soda, and tincture of henbane; — or camphor may be given in a mucilaginous mixture with hydrocyanic acid. Immediate relief is often obtained by applying on the pained part a piece of flannel wrung out of hot water, and sprinkled with spirit of turpentine, or with the following liniment: —

No. 261. ℞ Linimenti Camphoræ Comp., Linimenti Terebinthinæ Comp., āā ℥j.; Olei Cajuputi et Olei Limonis āā ʒj. M. Fiat Linimentum vel Embrocatio.

These embrocations should be covered by a dry cloth, or by wash-leather, to prevent evaporation, and be kept applied to the affected part until they occasion redness and burning heat of the integuments. I have seen the pain removed also by the inner bark of the mezereon, previously moistened and softened, and kept applied to the part until a superficial sore was produced.—If pain or tenderness in the spine be also complained of, the means about to be noticed (§ 85, 86.), may be prescribed.

79. *c. Hysterical pain in the regions of the stomach and spleen* (§ 17.) often resists medicine, and disappears spontaneously, especially after marriage, or from changes in the states of the uterine system. It is sometimes relieved by camphor conjoined with hydrocyanic acid or with the acetate of morphia, or by the other antispasmodics and anodynes mentioned above (§ 78.). The warm epithem and embrocation, just recommended, has, however, proved most successful in my practice. Large doses of the subcarbonate of soda, with a carminative mixture or spirit, and tincture of henbane or of opium, often afford relief. An enema, containing either the spirit of turpentine and castor oil, or assafœtida and confection of rue, generally proves very serviceable.

80. *d. When pain is severe in the region of the descending colon and left iliac region* (§ 18.), or in *other parts of the abdomen*, with flatulent distension, increased sensibility, and other symptoms

resembling *peritonitis* (§ 21.), the above treatment is more to be depended upon than any other. The warm epithem or embrocation should never be omitted. The enema just prescribed will seldom fail of emptying the large bowels, and of expelling the flatus which is a chief cause of the more painful symptoms. When the complaint assumes the form of *hysterical colic*, the bowels being costive, these means are usually eminently successful. They may require, however, to be repeated. If palpitations be present in these cases, they depend upon, or are aggravated by, the flatus which often rises up into the œsophagus, and, by distending a portion of this canal, embarrasses the auricles of the heart. Hence the benefit which results from the means which are most efficacious in expelling the flatus, particularly from those just named; and from calcined magnesia, prescribed with antispasmodics and carminatives, or warm purgative tinctures. — *For pain in the region of the liver* (§ 30.), the treatment here advised will be appropriate. In all these states of the complaint, the bowels should be kept moderately open by mild or stomachic purgatives.

81. *e. When pain is seated behind, or just above the pubis* (§ 20.), and particularly when it extends to the sacrum, to the os coccygis, or when it implicates the urinary bladder, or its functions, irritation, or vascular turgescence, or congestion of the uterus, may be inferred. Local depletions ought then to precede other means; and the mode, amount, or repetition, of depletion, should depend entirely on the habit of body of the patient, and the state of the catamenia. After those have been prescribed, the bowels must be evacuated by mild or stomachic purgatives, and the circulation equalised by cooling diaphoretics and anodynes. Camphor mixture, almond emulsion, solution of acetate of ammonia with nitrate of potash, spirits of nitric æther and tincture of henbane, are generally useful in these cases. But if the pain still continue, the external means above advised, and the enemata (§ 78, 79.), should be resorted to.

82. *f. Pain in one or both mammæ* (§ 29.) is sympathetic of irritation or turgescence of the uterus or the ovaria; but it is sometimes associated with tenderness of one or two of the dorsal vertebræ. It is often removed by the treatment now prescribed. If there be scanty menstruation, leeches may be applied to the mammæ; but the tops of the thighs, and hypogastrium, are preferable situations. I have found cooling diaphoretics with narcotics, as the solution of the acetate of ammonia, and camphor julep, with the acetate of morphia and an aromatic spirit, very serviceable in this state of disorder. In a case of this kind, where there were remarkable tenderness and hardness of the left mamma, evidently depending upon uterine irritation and turgescence, and for which I was consulted by another practitioner, complete recovery followed a short course of the solution of the iodide of potassium in camphor mixture, to which the solution of potash and henbane were added. If tenderness exist in any of the dorsal vertebræ, the treatment advised for this complication (§ 85.) should also be pursued.

83. *g.* In the *more acutely painful or neuralgic affections* connected with uterine disorder, the effect of a plaster with the extract of belladonna and camphor may be tried. But when they are associated, as sometimes observed, with pain or tenderness in some portion of the spine, then the other local means about to be noticed may be also employed. I have seen the most marked benefit result, in these more acute cases, from half an ounce each of spirits of turpentine and castor oil, taken on the surface of milk, and repeated once or twice after the intervals of a day or two; or from a full dose of the former medicine, followed by the enema already mentioned (§ 79.), or by any suitable purgative. Repeated doses of turpentine, until either the kidneys are affected, or the bowels are entirely evacuated, and enemata containing a considerable quantity of this substance, will be found the most efficacious, when painful affections, connected with hysteria, are seated in, or extend to, the lower extremities.

84. *h. Pain in the region of the kidneys, and in the course of the ureters* (§ 22.), is evidently an extension of irritation from the uterus to these organs by direct sympathy, — a considerable portion of the nerves of the generative and urinary organs belonging to the same ganglia. The treatment should, therefore, be chiefly directed to the state of the uterine system. Local depletions will sometimes be requisite, especially if there are general or local plethora, and scanty menstruation. The fixed alkalies or the alkaline subcarbonates, with anodynes and the spirits of nitric æther or the compound spirits of juniper, will occasionally be of service, especially when the urine deposits a sediment of uric acid in the form of sand. When the urine is higher coloured, or deposits a pink or amorphous sediment, consisting chiefly of the lithate of ammonia, the infusion or decoction of cinchona with hydrochloric acid, or the balsams taken in the form of pills with magnesia, will be found beneficial. The digestive functions should receive due attention. A rubefacient, stimulating, or roborant plaster applied on the loins, as the aromatic, cummin, pitch, or ammoniacum plaster, will often also afford some relief.

85. *i. Pain in the spine* (§ 23.) is rather a complication, than a form, of hysteria; and is not to be viewed as altogether, or always, depending upon inflammatory action or irritation; but rather upon excited sensibility. There is no doubt that vascular excitement or congestion often exists in these cases, especially where there is much tenderness or prominence of one, two, or more of the spinal processes, or puffiness around them. In these cases, especially, there is more or less continued disorder of the uterine, or of the digestive, or of the respiratory functions, or even of all of these, according to the seat and extent of the spinal affection; and occasionally the cerebral circulation becomes also deranged. To this affection, DARWELL, TEALE, TATE, BROWN, and GRIFFIN have directed particular attention, under the name of *Spinal Irritation*, or, more properly, irritation of the spine, and have recommended for it local depletions and external irritants, &c. But whoever confides in these alone, or even principally, will find himself disappointed in many, if not in the majority of cases. They often, however, are important parts of the treatment, especially if plethora, general or local, or scanty menstruation, exists. In cases of this description,

the digestive functions should receive strict attention, the bowels being kept regularly open. In the majority, and particularly if there is debility or deficiency of blood, or too frequent or too copious menstruation, the sulphate of quinine, with camphor and extract of hop, or extract of hyoscyamus; the preparations of cinchona, with the alkaline subcarbonates, or with the mineral acids, according to circumstances; and the preparations of iron; will prove of great service, if appropriately administered. In some instances of the association of hysterical affection with tenderness of the spine, and with neuralgic pains in the corresponding nerves, I have found, after local depletions and alvine evacuations, pills containing full doses of the sulphate of quinine and sulphate of iron, with camphor and extract of hyoscyamus, very beneficial, and have added the purified extract of aloes to them with advantage, when the bowels were costive, or the catamenia deficient. Where the powers of the constitution are not impaired, or where there is excited action, an occasional recourse to the draught with spirits of turpentine and castor oil, or to the enema containing the same substances, will be of essential service.

86. *External means* of various kinds have been applied to the spine in these cases, often without benefit, sometimes with detriment, particularly when the increased sensibility depended upon sympathy with other parts, and upon great nervous debility. When there is sufficient evidence to infer that inflammatory irritation and turgescence have been excited in the membranes or investing structures of the spinal cord, then certain of these applications, as leeches, scarification and cupping, the tartarised antimonial ointment, or issues, will be more or less beneficial; but in other circumstances they will be of no service. The relief which has followed the application of blisters, or of rubefacient and stimulating plasters, is no proof that the morbid sensibility of the spine depended in these instances upon inflammatory excitement or vascular turgescence; for, if these morbid states had existed in any degree of sthenic activity, these applications were more likely to have aggravated, than to have removed, them. Where they have actually given relief, there is reason to infer that the morbid condition was one of deficient vascular and nervous energy, rather than the reverse; and one for which general restoratives or tonics, as well as local excitants, were required. Much attention to the states of the various functions, particularly of those of the abdominal and pelvic viscera, and great discrimination, are necessary in these cases, to determine aright as to the local means appropriate to the various conditions of this class of affections. There are some applications which will not be injurious under any circumstance, but will be serviceable in many. The chief of these are the warm terebinthinate epithem and embrocation already noticed (§ 78.), applied over that part of the spine, chiefly, where pain is felt. Plasters, also, consisting chiefly of ammoniacum, compound pitch, or of red oxide of iron, &c., will subsequently prove useful. Where signs of inflammatory action of the ligamentous or other structures of the spine are present, the above liniment, epithem, or embrocation, applied to the affected part; and setons, issues, or open blisters, some distance below it, so as to produce a derivation from the seat of morbid action; will frequently afford great relief.

87. *k. Pain in the sacrum and os coccygis* is generally not to be imputed to the same morbid states, as that referred to the spine. It frequently depends upon the condition of the uterus, particularly about the *os* and *cervix uteri*, and requires the same treatment as that advised for pain behind or above the pubis (§ 81.). Whether proceeding from this source, or from disorder near the origins of the nerves, or from disease of the structures of the spine, or of adjoining parts, the means just recommended, constitutional as well as local, will be useful when judiciously employed.

88. *l. Hysterical affections of the hip or other joints* (§ 26.) are very difficult to manage, and require, for their removal, not merely an improvement of the general health, but also strong impressions upon the mind and nervous system. The *intentions of cure* above stated (§ 76.), should be fully followed out, and the particular means already described fairly tried. The medicines which I have found the most successful are — the *spirits of turpentine**, prescribed in various modes, internally and externally, and administered in enemata; the *preparations of iodine*, alone, or with *narcotics*; and *camphor*. These, however, should be associated with suitable adjuvants; amongst which, the several *narcotics* and *antispasmodics* are the most important. The warm or vapour bath, simple or variously medicated; mental excitement, and exercise taken regularly and energetically; and employment of the mind; are also important aids in the treatment. The affections of the joints are sometimes accompanied, or even alternated, with severe nervous pains in the extremities, and occasionally with tenderness in some portion of the spine. In such cases, the treatment hardly requires any material alteration. In those which have come under my care, I have very frequently prescribed the spirit of turpentine, as already stated (§ 83.), and often repeatedly in enemata; and, after two or three doses of it, I have commenced with the preparations of iodine, conjoined with henbane, opium, or belladonna. Whilst the iodine has been given, the turpentine has been administered in enemata, from time to time; and the embrocation or liniment above described (§ 78.), assiduously employed. In recent cases, particularly when the knee-joint was affected, this treatment has removed the disorder in a few days. In the case of a lady, whom I saw with Mr. FAXON, the complaint in this joint was almost instantly removed by the warm turpentine epithem applied around the knee. Various other medicines may be tried, and, indeed, require to be tried, before some of the foregoing will be submitted to by the patient. Most of the cases which I have seen, have been very obstinate, and have been treated by the more usual remedies, as the mineral sulphates, the preparations of iron, the sulphate of quinine, narcotics, &c., before I saw them. Sir B. BRODIE mentions favourably a

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* The spirit of turpentine was first recommended by the author for these states of hysteria, and for neuralgic and similar affections. It has recently been advised for the same complaints by some French physicians. The originality of the practice may be known, by referring to *A Memoir on the Employment of Terebinthinous Remedies in Disease*, by JAMES COPLAND, M.D. &c., published in the *Lond. Med. and Physical Journal*, for July and August, 1821, p. 107—193.

long continued course of the sulphate of copper in small doses. The external application of the vegetable alkaloids, and of their salts, particularly veratria, aconitina, &c., in ointments or liniments, has recently been recommended for cases of this description, and particularly for those attended by neuralgic pains, in much stronger terms than the real advantage derived from them warranted. I have prescribed these preparations in several instances of this kind, and have had the prescriptions prepared by the very best chemists, but permanent advantage was seldom derived from them.

89. Local hysterical pains will sometimes be relieved by friction with a stimulating liniment containing some narcotic (F. 297. et No. 261.) Sir B. Brodie recommends a lotion consisting of equal parts of spirit of rosemary and camphor mixture to be applied tepid to the affected part. The simple exposure of the part to the vapour of hot water — the heat and vapour being confined by oil-skin, or by any other means — will often be useful. The vapour bath, employed thus locally, will be still more serviceable when the affected limb is cold, or is alternately hot and cold. It has been recently prescribed by Dr. J. Wilson in these and similar affections. (*Pract. Treat. on the Curative Effects of Simple and Med. Vapour applied locally, &c.* 8vo. Lond. 1837.) — Sir B. Brodie states, that he has found the hysterical painful affections characterised by alternations of heat and cold, much relieved by the following plan: — "During the hot fit, let a compress be applied wet with a cold spirituous lotion; and when the heat has subsided, let a thick woollen stocking be drawn over it, and then an oiled silk covering over the stocking, so as to confine the heat and perspiration. When the cold fit has subsided, the oiled silk covering may be removed. This treatment, however, should be combined with the exhibition of the sulphate of quinine." I have found the quinine more beneficial when given with camphor in these cases. The oxides or carbonates of iron may also be tried in electuaries; and conjoined with the confection of senna or of scammony, when the bowels are costive.

90. *B. When hysteria assumes anomalous spasmodic forms, or stimulates other spasmodic affections* (§ 31.), the same principles of treatment as have been already explained should be adopted, according to the states of general or local vascular plethora, and of uterine function, and to the symptoms referrible to the spine. There are few cases of this kind in which the spirits of turpentine, judiciously prescribed, or administered in enemata, will not prove of essential benefit; and some will require, in addition, the warm epithem, liniment, or embrocation, already described (§ 78.). But these can often be resorted to only at considerable intervals. The tonics, antispasmodics, and anodynes, — the general plan of treatment recommended, — must be duly exhibited; and if evacuations be necessary, they should be resorted to as above directed. In most respects, these affections require nearly the same *indications of cure*, and the *same means* to fulfil these indications, as have been directed for the more painful complaints just passed under review, and particularly for those seated in the joints and extremities.

91. For *hysterical cough* or *asthma*, antispasmodics with anodynes or narcotics are very useful. The preparations of valerian with ammonia or camphor, and henbane; a weak decoction of senega with emollients and hydrocyanic acid; small doses of ammoniacum, assafœtida, or of squills, with demulcents; the alkaline subcarbonates and extract of poppy, &c.; will severally be found of service. The treatment, however, must be modified, as previously advised, according to the states of the constitution and habit of body, of the catamenia, and of the temperature of the surface. The *external means* described above (§ 86.), will very materially assist the internal remedies; and sometimes the warm bath will be useful. — In *hysterical hiccup*, camphor and other antispasmodics, with anodynes, and the means just noticed, cold fluids, and cold enemata, will be found advantageous. (See also the *Treatment* advised for Convulsions, and for Chorea and its related Affections.)

92. *C. The comatose, cataleptic, or soporific states of hysteria* (§ 33.) require but slight modifications of either the indications or means insisted upon above. During these states, the remedies advised for the paroxysm may be employed, appropriately to the local or general states of the circulation; and the most important of these are cold affusions or cold lotions on the head; and, in some instances, enemata of cold water, or containing the spirit of turpentine, or assafœtida, or camphor. Subsequently the treatment should be directed according to the state of the cerebral circulation. In most cases of this kind, the disorder of the uterus has excited, or otherwise deranged, the circulation in the brain; but generally in such a manner as to be relieved by the shower bath, or by frequently sponging the head with cold fluids. Due attention to the states of the bowels and of the catamenia, and the other means advised for Catalepsy and Cataleptic Ecstasy (§ 18.), are necessary for cases of this kind. When hysteria assumes the form of *syncope* or *leipothymia*, sprinkling the face with cold water; the *cold douche*, or affusion on the head; volatile or empyreumatic vapours, held at some distance from the nostrils; bathing the face and neck with aromatic waters or spirits; pure air, &c.; are the chief means of restoration; after which the treatment must be conducted as above.

93. *D. Paralytic affections and aphonia* (§ 35.) hardly require any notice as respects the treatment, as the *indications* and *means* of cure already prescribed, are equally appropriate for them. After the bowels have been freely evacuated, and local irritations or congestions removed, a resolute exertion of volition, exercise in the open air, and mental and bodily employment, as far as they can be pursued, are especially beneficial in them, particularly when aided by a judicious administration of tonics or antispasmodics; by suitable diet and regimen (§ 100. *et seq.*); and by recourse to external remedies—particularly to frictions of the surface with stimulating and rubefacient liniments, to warm or medicated baths, &c.—When the paralytic state is manifested chiefly in the alimentary canal or urinary bladder, enemata containing the spirit of turpentine, or the warm terebinthinate epithem, or embrocation, applied over the abdomen, will be found almost immediately efficacious.

94. *E. Hysterical disorders of the mental faculties* consist not merely of the states already men-

tioned (§ 38.), but of others, of a less decided, but not less morbid, kind. Hysterical females are not merely capricious or whimsical; but they often become enthusiastic for a time, in the pursuit of an object, or in cherishing an emotion by which they have been excited. In many such cases, the nervous excitement and vascular turgescence of the uterine organs determine the character of the mental disorder; elevating certain of the moral sentiments, or of the intellectual manifestations, to a state of extravagance, passing, in some instances, into delusion or monomania. Many cases of puerperal mania are merely extremes of the hysterical disorder of the moral and intellectual powers or states of the mind. All these more extreme forms of mental affection are observed only where, in connection with much local or uterine irritation, there is great deficiency of nervous energy generally, and of mental power in particular; or where, with such deficiency, there has been either much injudicious culture, or perversion, or improper excitement, of the imagination.

95. Females sometimes become passionately attached to an object; and this passion may advance even to nymphomania or monomania. The same person, on experiencing a disappointment in her affection, or if she be placed in circumstances entirely preventing the enjoyment of her passion, often becomes enthusiastically religious, especially if powerfully excited by popular preachers. After field preachings, or other ministrations of an exciting kind, the most hysterical females, especially those who have experienced the fully developed fits on these occasions, have become, at least for a time, the most religious. In this, however, there is little to regret: there is no harm, and generally much good, from this direction of the feelings; unless, indeed, advantage be taken of this excitement by certain Tartuffes, especially at love-feasts, &c., — a circumstance by no means rare.

96. The hypochondriacal feelings, the desire to deceive, or to simulate various diseases, or the delusions, which sometimes possess the minds of hysterical females, may be classed with the foregoing, as requiring a similar plan of treatment. In all of them, the *intentions of cure* are — to remove irritation or vascular turgescence of the uterine organs; to improve the general health; to strengthen the nervous system; to calm the imagination; and to guide the moral impulses of the patient. The means by which the physical portion of these indications are to be fulfilled, have been sufficiently explained. The most efficient, however, of these means are not likely to be adopted by the patient, if she is entirely uncontrolled by friends. Few will resort daily to the shower bath, or even occasionally to terebinthinate enemata, or submit to a course of tonics, or to a suitable regimen, &c., whilst she believes her health but little affected. Even when the hysterical disorder is of a very painful kind, the variability or capricious state of her mind leads her to run from one physician to another, before opportunity of administering aid is afforded to any. At last, the most notorious charlatans, particularly those who either excite the body through the mind, or the mind through the body, — the animal magnetisers, the Homœopathists, the St. John Longs of rubbing celebrity, and the Campbells of celestial-bed notoriety, — fix her attention. At such medical bagnios there is something promising gratification as well as excitement, and at such places hysterical as well as hypochondriacal patients "most do congregate."

97. iv. Of the Prophylactic Treatment of Hysteria. — *a. The avoidance of the occasional causes* is the chief part of this treatment; and this is very difficult. The moral emotions and desires constitute the principal of these causes, and the prevention of them is not in the power of the physician; and, considering the general frailty of our nature, rarely in the power of the patient. — A physician, sufficiently acquainted with human nature, and with human life and society, will frequently discover the connection of the complaint with the feelings, and be able to give useful hints to the patient or her friends, as to the moral as well as to the medical management of the complaint. But his proper business is to correct the predisposing or constitutional cause, and to enable the patient to resist the exciting causes. An indolent, a luxurious, and an unoccupied life, leads to late hours in bed, to an excited state of the imagination, to susceptibility of the nervous system, to irritation and turgescence of the generative organs, and to general or local plethora. It cannot be sanguinely hoped, that females will relinquish ease, luxury, and enjoyment, from the dread of a distant and contingent ill. Most physicians of experience must have often observed the influence of these causes on the health, and have met with instances of females, who, when in ease and luxury, were subject to hysteria, having become entirely free from it, when reverses of fortune obliged them to employ both mind and body.

98. *b.* Much depends upon the *moral* and *physical* education of females about the period of puberty, in preventing hysteria. If more time were devoted to air and exercise, and less to mere accomplishments — if less strenuous efforts were made to cram much ill-assorted knowledge into the mind, in a very limited period — than usually is the case in the present day, an improved state of nervous energy, and of constitution generally, would result. There would consequently arise a race of females, possessed of stronger minds, and better able to make good wives and healthy mothers, than those too frequently met with in the easier ranks of life.—Of all the physical influences, by which the human constitution is permanently impressed in early age, there are none so powerful as *light*, *air*, and *exercise*. Females, while the frame is being developed, should strictly observe early hours, so that the *period of repose* should never be prolonged much after the dawn of morning. The propriety of *sleeping* in a large, well-ventilated room, cannot be disputed. It will be prudent, where more than one must sleep in the same apartment, to have separate beds, each no larger than is necessary for one person; and if the room is sufficiently large and airy, three, but no more, should sleep in it, preferably to two. When very early rising is enforced, the kind of bed, on which growing females should sleep, is not very important, although a hair mattress is perhaps the best; but the bed-clothing should be light, and the sitting, as well as the sleeping, apartments ought to be moderately cool and airy.

99. The kind of exercise which is most serviceable, is that taken in the open air and in the light

of day, and which brings into action the voluntary muscles generally, especially those of the lower extremities. It should preferably be on foot, and be regular, daily, and neither too little nor excessive. Sydenham, Fuller, Mandeville, and Manning advise riding on horseback, as affording the briskest motion, and occasioning the least fatigue. It ought always, however, to be used when the stomach is most empty; for, after a full meal, it retards digestion, rendering it uneasy and flatulent. It is most serviceable when hysteria is associated with retention of the menses, and a chlorotic state of the system, or when there is torpid action or obstruction of the digestive and abdominal viscera. In cases of this description, the advice given by Mandeville will be found of great benefit. This is, to rise before six; to have half an hour's exercise in a swinging chair, flying horse, or the common swinging rope, and then breakfast; some time afterwards to get on horseback, for at least two hours, either galloping or trotting, as much as her strength will permit her; and, immediately after this, to be undressed, and assiduously chafed or dry-rubbed for a considerable time, till her skin looks red, and her flesh glows all over. Manning observes, that frictions are useful, not only in the cure of the paroxysm, but also as a prophylactic. He directs them to be used on the extremities and trunk of the body, and especially on the abdomen when the digestive organs are weak. If hysteria be attended with the anomalous symptoms already noticed, or assume an irregular form, friction applied daily and assiduously along the spine, will be of great service. Sailing has been recommended by Dr. Gilchrist, in the treatment of hysterical and other nervous complaints; and in certain circumstances it will be found useful.

100. *c. Cold bathing*, particularly salt-water bathing and the shower bath, will generally be serviceable at this period of life, if females have no particular dread of either, and if the surface of the body be afterwards well rubbed, and smart exercise immediately taken. For delicate constitutions, with a predisposition to the disorder, it will be preferable to commence with a warm salt-water bath, or with a tepid shower bath, the temperature being gradually lowered to the usual grade. Sponging the surface of the body also, every morning, with salt and water, or with water containing some vinegar or a little of the nitro-muriatic acid, the temperature being at first tepid, but gradually reduced to the usual mean of cold, will generally prove most beneficial, not only in preventing the complaint, but also in removing it.

101. *d.* Various *mineral waters* frequently prove of great advantage in the preventive, as well as in the curative, treatment of hysteria. There is no doubt of the *Bath* waters being often beneficial in this complaint, although fashion has brought them into disuse, by bringing others into more general notice than they deserve. In females of a delicate constitution, with a languid state of the circulation, and want of tone of the nervous and muscular tissues, these waters, with proper management, will generally be most useful. In a similar state of system, the mineral waters of *Vichy*, *Barèges*, *Marianbad*, *Eger*, *Carlsbad*, *Pyrmont*, *Spa*, *Hartfell*, and *Tunbridge*, will also be of great service, if employed appropriately to the pathological peculiarities of the case. The stronger chalybeates, however, should not be prescribed when the complaint is connected with general plethora, or where there is very marked vascular turgescence, or excited action of the generative organs. Where these waters are indicated, as well as in more doubtful cases, the springs of *Ems*, of *Bath*, and of *Seltzer*, will often be very beneficial. Seltzer water with warm milk may be used as the common beverage in most cases. As most of these waters may be procured in London and Brighton, there can seldom exist much difficulty in trying them, without leaving this country, or even the patient's home. The warm mineral waters can, however, be used only in *Brighton*, where they are prepared in a way not much inferior to their natural state. — In connection with the use of suitable mineral waters, *change of air* will be most beneficially prescribed. Indeed, much of the benefit attributed to the former actually proceeds from the latter; and in all cases where benefit is derived, both means are concerned in producing it.

102. *e.* The *diet* of hysterical females, as well as the medicines prescribed, should have strict reference to the states of the vascular system and of the uterine organs. In general, a milk diet, as advised by Sydenham, is very serviceable, particularly where debility is present; but much animal food is hurtful, especially where there is a tendency to plethora. A fish diet, and the use of shell-fish, are not less injurious, as favouring uterine turgescence, although much less productive of vascular fulness. A spare and cooling diet, consisting chiefly of farinaceous substances, is the most generally appropriate; but a somewhat liberal use of animal food is occasionally requisite. Slops, as weak tea, should be avoided. Boiled milk and bread should be preferred to either tea, chocolate, or coffee. The last is generally too heating, and ought not to be allowed, when the symptoms of uterine turgescence or irritation become very prominent.

103. *f.* Patients subject to hysteria should avoid warm apartments, and crowded rooms or assemblies. The extremes of *temperature* are often injurious to them. They should preserve their extremities warm, and be careful not to confine any part of the body, and particularly the waist, by too strait clothes or stays. — Mental and physical *occupations* are amongst the most beneficial means of treatment in this complaint; and advice respecting them should never be overlooked by the physician. The nature or kind of employment must entirely depend upon the circumstances and condition of the patient. The reading of exciting novels and of loose romances, and even music, are mere dissipations of time. The former ought not to be permitted by those who have the power of preventing it: and the latter should be subjected to a judicious control, and cultivated truly as an accomplishment, and as a relaxation from severer, and more rational, and more useful occupations.

104. As to advising marriage for young hysterical females, this, perhaps, may be as well let alone, although I do not altogether agree with Mandeville, as to the risk of their children inheriting the complaint. He remarks, " in the first place, it may fail, and then there are two people made unhappy instead of one; secondly, it may but half cure the female, who may have half a

dozen children that shall inherit it. A physician has a public trust reposed in him: his prescriptions, by assisting some, ought never to prejudice others; besides, a young lady may not marry so well whilst she labours under this infirmity, as if she was in perfect health. Therefore, let her either be first cured, and then marry without being injurious to herself, her husband, or her posterity; or else remain single, with this comfort, at least, in her affliction,—that she is not liable to entail it upon others, who should be no less dear to her than herself." A principal reason for hysterical mothers having children that are hysterical and nervous, is, that they are generally bad nurses,—their milk being either deficient, or innutritious: when their infants are suckled by strong and healthy nurses, no such hereditary influence is usually observed. Nothing is of greater advantage in hysterical disorders, than mental tranquillity and cheerfulness. Fear, grief, and anxiety ought to be avoided, and the mind should be agreeably entertained and interested by useful employment.

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HYSTERITIS. See Uterus—*Inflammations of.*

JAUNDICE. — Syn. *Icterus* (from ικτερος, the golden thrush, the sight of which was supposed by the ancients to cure the disease), Pliny, Cælius Aurelianus. *Morbus Regius*, Celsus, Pliny. *Morbus Arquatus*, *M. Arcuatus*, Columella, Celsus. *Aurigo*, Plautus, Varro.

Cachexia Icterica, Hoffmann. *Icterus*, Boerhaave, Linnæus, Cullen, &c. *Cholelithia Icterus*, Young. *Icteroides, Fellis Suffusio, Fellis Obstructio, Icteritia*, Auct. var. *Jaunisse, Ictère*, Fr. *Die Gelbsucht*, Germ. *Iterizia, Citrinezza*, Ital.

CLASSIF. — 3. *Class*, Cachetic Diseases; 3. *Order*, Cutaneous Diseases (*Cullen*). 1. *Class*, Diseases of Digestive Function; 2. *Order*, Affecting the Viscera (*Good*). IV. CLASS, I. ORDER (*Author*, in *Preface*).

1. DEFIN. — *Yellowness of the eyes and skin, sometimes passing to a yellowish-green hue, or even to a greenish brown; the urine being of a saffron or deep colour, the stools generally pale, and the course of the bile obstructed.*

2. There are few diseases, the nature and morbid relations of which have occasioned greater diversity of opinions than jaundice. By some it has been viewed as a symptom of derangement, or of organic lesion, of the biliary apparatus, more immediately dependent upon obstructed discharge, and upon absorption, of bile. Others have considered it as independent of absorption of this secretion, and as the result of a morbid state of the capillary circulation. These, as well as other opinions, will be more fully noticed in the sequel; and I shall then show that it cannot be considered merely as a symptom of the morbid states of the biliary apparatus, to which it has commonly been attributed, although very often connected with, and sometimes originating in, these states. It occasionally appears in the course of bilious fevers, when there is no obstruction to the evacuation of bile. But the yellowness observed in the last stage of yellow and malignant fevers is not a symptomatic jaundice, the change of colour depending, in these maladies, upon the morbid state of the blood, and upon the change in the capillary vessels and circulation, independently of biliary bstruction.

3. Jaundice is generally *sporadic*; but, according to MONRO, ALIBERT, and others, it has assumed, on rare occasions, an *epidemic character*, particularly at the terminations of campaigns, and after, or during, very wet summers and autumns. It was thus said to have been epidemic in Cronstadt, in 1784 and 1785; and at Geneva, in 1814.—It is *endemic* in some places, particularly those in which, with a high range of temperature, the sources of malaria abound (see ENDEMIC AND EPIDEMIC INFLUENCES); but it is generally owing to the prevalence of biliary diseases and periodic fevers in these localities, that jaundice is also endemic.

4. I. SYMPTOMS.—*A. Precursory.*—Jaundice generally approaches with languor, depression of spirits, slight chills or rigors, anorexia; with uneasiness, tension, or weight at the præcordia; with flatulence, sour eructations, sometimes nausea or vomiting, or other disorders of the stomach; or with colicky pains, disturbed or irregular bowels, and headach. The stools are hard, ash-coloured, clayey, or whitish, indicating an absence of bile; and sometimes relaxed, although the evacuations are pale or whitish. In rarer cases, the biliary secretion is apparently more than usually profuse. The stools are commonly devoid of their usual odour, and are more or less offensive. There is an unpleasant taste in the mouth, with some thirst. The tongue is loaded at its base. The skin is dry, and an itching or stinging is often felt on the surface. These symptoms are usually of short duration, and the affection manifests itself with much celerity.

5. *B.* The *yellow tinge* generally begins in the eyes, and extends to the temples, brows, and face; and thence to the neck, chest, and whole surface of the body. The colour is deepest in the wrinkles and folds of the skin, and in the lines of the face and hands. Sometimes it is distributed in deeper patches in one place than in another. It commences in the superior parts of the body, appears latest on the inferior extremities, and departs first from the parts where it commenced. The colour varies from a light yellow or lemon-colour, to a greenish brown; the intermediate shades of pale yellow, deep yellow, and yellowish green, being most common. With dryness of skin there is generally increased heat, particularly on the hands and feet. The itching and stinging are often also augmented, especially towards the night, and are most troublesome about the nostrils. In the more advanced stages, this symptom is diminished. The perspiration often then becomes free, particularly if the disease be attended by fever; and in some cases so abundant as to wet the linen, and to tinge it of a deep yellow. Sometimes a desquamation of the cuticle, or a psoriform eruption, follows these symptoms.

6. The bowels are frequently costive, and the fæces clayey, pale, and scanty; but in some cases they are loose, and have a peculiar fœtor. The urine is commonly high-coloured; yellowish and limpid at the commencement, afterwards deep saffron-coloured or reddish, frothy, and thick. Sometimes it is nearly black, depositing a brick-coloured sediment; at other times a dark deposit. As the disease subsides, the urine resumes its clear and limpid appearance, unless dropsy supervene. The patient generally complains of a severe, heavy, or lancinating headach, with a sense of heat, particularly at the forehead; and he often falls into a state of despondency or melancholy, or becomes morose. There is sometimes lethargy, and frequently watchfulness. The tongue and palate are coated with a yellowish sordes, and a bitter taste is felt in the mouth. The appetite is extremely irregular; sometimes being entirely lost, at other times ravenous. Thirst is usually present. Pain, weight, or a dragging sensation, and tenderness, are often felt at the epigastrium; frequently with flatulence, acrid eructations, nausea, difficult or painful digestion, and vomiting of a bitter, acrid, and sometimes dark, fluid. In some cases, acute pain runs in the course of the common duct, and increases as it reaches the epigastrium, with more or less uneasiness in the region of the liver, and top of the right shoulder, or beneath the right scapula, or between the shoulders. Violent pain is occasionally felt in the stomach, with short fits of colic. The respiration is readily accelerated, especially upon exertion; and there are sometimes paroxysms of cough. The pulse varies exceedingly. At the commencement, it is often hard and strong, but it is also frequently feeble, particularly as the disease advances. When severe paroxysms of pain are complained of, the pulse generally becomes frequent, hard, or full; but it is occasionally much slower than natural. Hæmorrhoids sometimes occur during

the disease; and they have often, after having discharged freely, proved a salutary crisis. Epistaxis has also been followed by a favourable result; but less frequently than the former evacuation.

7. Some *anomalous* appearances have been remarked during jaundice, which are deserving of notice, from the light they may throw on its pathology. The most important of these are — 1st. The suddenness of the attack — the almost instantaneous occurrence of it after violent affections of the mind. — 2d. Its restriction to particular parts of the body. BEHRENS, VALSALVA, ETTMÜLLER, and others, have observed it confined to the palsied side, in cases of hemiplegia. Dr. CHAPMAN has seen it limited to the face. A similar case has occurred to myself: and instances of its appearance only in the eyes are not uncommon. Allied to these states is the varying deepness of colour in different parts of the body. The deep greenish brown, verging to black, of the skin, commonly called green or black jaundice, described by Dr. Baillie, has been observed in one part of the body, whilst the usual yellow tinge has existed in others. LANZONI met with a case, wherein the throat and face were green, the right side of the body a greenish black, and the left yellow.— 3d. The yellow tinge, which objects occasionally exhibit to the patient during this disease, has been a matter of dispute; but it has been noticed, and believed in, by the majority of ancient authors; and was first disputed by MERCURIALIS, and afterwards by HALLER, HEBERDEN, CHAPMAN, and a few others. I believe it to be of rare occurrence, but to undoubtedly occur, when the cornea, or humours of the eye, participate in the yellow tinge, with the other parts of the body.

8. *C.* DURATION. — Jaundice may disappear, or terminate fatally, in a short time; or it may continue for many months. When it proceeds from moral or mental causes, it is generally of much shorter duration, than when it depends upon visceral disease. In the latter case, it may endure even for years. — But instances sometimes occur of its rapidly fatal termination, when proceeding from acute visceral inflammation, particularly from inflammation of the substance of the liver, and when accompanied by depressed vital power, much fever, and a very frequent pulse. I have seen death occur as early as the fourth day in such circumstances. The darker forms generally proceed more rapidly, especially to an unfavourable issue, than the lighter shades of the complaint. But the duration of it entirely depends upon the constitutional powers of the patient, and the pathological conditions which occasion it.

9. *D.* TERMINATIONS. — Jaundice, like most other diseases, terminates in three ways. — 1st. In a return to health; — 2d. In some other malady; — and 3d. In death. — *a.* Restoration to the healthy state generally takes place without any apparent crisis, although a critical evacuation is sometimes observed. As soon as biliary obstruction is removed, the stools become darker; the urine paler, and the discoloration of the skin begins to disappear, the parts first changed being the first to regain their healthy hue. The *critical evacuations*, are *bilious diarrhœa*, very abundant *perspirations*, *hæmorrhoids*, and *menorrhagia*. In a case which I lately attended, the jaundice rapidly disappeared after the discharge of a blackish inspissated bile, which had evidently accumulated in the hepatic ducts and gall bladder for a long time. The quantity of this pitchy or tar-like matter which was evacuated, was surprising, furnishing a striking instance of the black bile or melaina of the ancients.

10. *b.* In other cases, the disease either acquires increased intensity, or assumes a modified character; — one of the varieties hereafter to be particularized occasionally changes into another. — In some instances, additional disorder is superadded, a severe or dangerous *complication* thus resulting; and in others, the jaundice disappears, but is replaced by another malady. Lethargy, coma, apoplexy, epilepsy, phrenitis, diarrhœa, cutaneous eruptions, inflammation and abscess of the liver, disease of the spleen or of the pancreas, dropsy, rheumatic attacks, &c., may thus supervene — the jaundice still persisting; — and ascites, anasarca, dysenteric attacks, abscess of the liver, and chronic enlargement of the spleen, may follow upon its disappearance. Jaundice is often, also, a symptom of inflammation and abscess of the liver; although these latter are sometimes consequences of the pathological state upon which this affection depends, particularly when they appear subsequently to it. But it is much more frequently a symptom merely; and is oftener consequent on, than antecedent to, or coetaneous with, inflammation or abscess of this organ. Indeed, chronic inflammatory action, or active congestion of the substance of the liver, giving rise to jaundice, is more common, and antiphlogistic means are much more frequently required for the removal of it, than is supposed.

11. *c.* The termination in death may be preceded by the morbid states now enumerated, particularly when they assume their worst forms; — or it may be ushered in by increasing and urgent depression; by sinking of vital power; by great despondency; by ascites or œdema of the lower extremities, or both; or by hydrothorax; by great emaciation, hectic fever, and total loss of the digestive and assimilating functions, and by irritability of the stomach. In some cases, it has given rise to lethargy, coma, apoplexy, palsy, convulsions, or delirium, previously to a fatal issue. — It occasionaly happens, as observed by Drs. CHEYNE and MARSH, that persons labouring under jaundice, whose nervous system has been previously injured, or greatly exhausted, are suddenly seized with cerebral symptoms, and die either phrenitic, or apoplectic, or in convulsions. But death by the sudden occurrence of coma, which becomes more and more profound, is the most common. Delirium also often precedes a fatal termination.

12. *E.* FORMS and STATES. — Jaundice may be considered as *idiopathic*, when it supervenes suddenly upon violent affections of the mind. It is *symptomatic*, — its common form, — when it proceeds from diseases of the liver and biliary apparatus, or from obstruction of the common bile duct, or from lesions of adjoining parts, &c. To these some authors have added a third form, which they have termed *critical*. GRIMAUD states, that it has occurred as a crisis in some fevers: and BIANCHI makes a similar remark, — at the same time stating, that when jaundice is critical, the

urine is almost or altogether natural; whilst in its symptomatic form it is generally of a deep yellow, and otherwise much changed.

13. Jaundice may present various *degrees of severity*. It may be accompanied with great febrile excitement, and thus assume an *acute form*, and quickly arrive at its termination. When this is the case, it is generally accompanied with active hepatic, or other visceral disease, and often passes into a very deep or greenish hue. I was recently called to a gentleman, aged about fifty, of a strumous diathesis, who had begun to ail the previous day. I found him slightly jaundiced, remarkably depressed in spirits, with a sensation of sinking at the epigastrium, the pulse being upwards of 120, and soft. The evacuations were at first clay-coloured and costive, but they soon became copious, black, and tar-like. Delirium appeared on the following day: spontaneous hæmorrhage from the bowels occurred, followed by coma, relaxation of the sphincters, and death on the fourth day. The jaundice progressively increased, and, on the third day, the surface had become a greenish brown. The friends would not allow the body to be inspected.

14. Jaundice may also proceed in an extremely *mild form*, or with but little constitutional disturbance,—the appetite, pulse, and mental powers being scarcely affected; and in this form it may continue long, or soon disappear, sometimes after very inefficient means of cure, or even without the use of any medicine. The liability of the disease to recur from slight causes — as errors of diet, intemperance, &c. — has sometimes given it an apparently *periodical* character, which, although contended for by some authors, is entirely accidental, or, at least, the consequence of a concurrence of several of its causes, at certain seasons or periods, especially in situations abounding in the sources of endemic maladies.

15. II. CAUSES.—i. The *Predisposing Causes* are indolence, dissipation, intemperance, and sedentary occupations, particularly those performed in a stooping posture, and with pressure on the hypochondria and epigastrium. Jaundice is not infrequent among the studious; and especially amongst those who are harassed by cares, disappointments, and the depressing passions, and whose nervous energies are exhausted. It seems also more frequent in hypochondriacal and hysterical persons, and those who neglect, or are deprived of, their usual active engagements. It is common to all ages and sexes. HEBERDEN found, that out of 100 successive patients with this disease, 52 were males. It is frequently met with in cooks, and bakers, and in workmen exposed to high ranges of temperature, or addicted to intoxicating liquors. In females, it is oftener observed during pregnancy, and after the cessation of the catamenia, than at other epochs.

16. ii. The most common *Exciting Causes* are the more violent mental emotions, as the sudden communication of distressing intelligence, fright, terror, rage, anger, grief, anxiety, despondency, losses and disappointments, jealousy, petulance, peevishness, and irritability of temper. I have known it to follow the communication of joyful intelligence. Particular kinds of ingesta, especially such as disagree with the digestive organs, as stale, unseasonable, and unwholesome fish; drinking cold fluids when the body is perspiring; cold applied to the feet and surface of the body after exertion, or during free perspiration; and the bites of animals, particularly those which are venomous; also occasionally produce jaundice, especially in those who have experienced a former attack. According to HOFFMAN, venereal excesses, and intemperance in the use of intoxicating liquors, are amongst the chief causes of the disease. Great debility and exhaustion of the nervous energies, and, as clearly demonstrated by Dr. CHEYNE and Dr. MARSH, mercurial courses, particularly when employed in hospitals and close apartments, sometimes occasion it. I believe, however, that mercurials are a cause, only when they are given to produce their specific effects, or, when the exhibition of purgatives has been neglected, when required. The prevalence of the disease during revolutions, invasions, sieges, and campaigns, has been remarked by many writers; and its occurrence after intemperance in eating or drinking must be familiar to all. The excessive use of coffee; austere, and acid, or unripe fruits; and, indeed, any error of diet, or deleterious substance received into the stomach; will sometimes produce it. The suppression of accustomed discharges and eruptions, and the retrocession of rheumatism and gout, also not infrequently occasion it.

17. When the pathological conditions of the biliary and digestive organs exist, with which this disease is most frequently connected, many causes, that under different circumstances would produce but little effect upon the system, will readily excite it. Severe pain, mental affections, an irritating purgative, or particular kinds of food, will sometimes be sufficient to give rise to an attack, especially when pre-existing disorders of the biliary organs is associated with great nervous exhaustion. Jaundice is not infrequently caused by obstructed circulation through the heart; and by a torpid state of the cæcum and colon, with accumulations of fæces and scybala in their cells. It often follows agues and other periodic fevers; and it then usually depends upon some one of the morbid states of the liver, already noticed. It often occurs in the course of bilious remittent fevers, and occasionally without any apparent diminution of the biliary discharge, and even with evidence of augmented secretion of bile. It is also often associated with dysentery, or with other diseases, as will be shown in the sequel.

18. III. The MORBID APPEARANCES most frequently found in persons who have died *with* jaundice, are the following: — *a*. The *surface of the body* generally preserves the same colour after death, as previously to dissolution. PORTAL and myself, however, have seen the intensity of colour diminished; and, in other instances, the skin of some subjects, who had never had jaundice, assume, after death, a deep yellow. The limbs are often flexible, and œdema of the extremities is not infrequent. The body is commonly emaciated. The serum in the œdematous limbs, as well as that in the internal cavities, is either of yellowish tint, or of a dark hue. The various structures are more or less tinged of the same hue, particularly the cellular, adipose, and serous tissues. The internal surface of the blood-vessels, and even the cartilages, tendons, periosteum, and bones, are sometimes also changed in colour. The muscles are often tinged, and softer and more flaccid than natural. MORGAGNI had re-

marked, that the substance of the lungs, heart, liver, kidneys, and spleen is often softened, and contains a yellowish, a greenish yellow, or reddish fluid; and subsequent observers have also noticed these appearances. Most of the *secretions* partake of the same tinge; and the serum of the blood is also similarly altered. The fluid effused into the ventricles of the brain and all the membranes, are thus changed; but the substance of the brain itself, and the humours of the eye, are generally of their natural colour.

19. *b*. The *liver* and its appendages, most frequently of all the viscera, present morbid changes. The liver itself has been found with all the lesions consequent upon every form of inflammation. It is sometimes greatly enlarged, its blood-vessels congested, its ducts engorged, and its structure softened, inflamed, deeply tinged, or suffused with bile, and containing one or more abscesses, or their remains, &c. At other times it is extremely pale, apparently devoid of blood and of biliary secretion, atrophied, hardened, scirrhous, and tuberculated. In one case it is changed to a white, parboiled state; in another converted into a fatty, steatomatous, tallowy, or adipocerous substance. Occasionally its ducts are loaded with green inspissated bile, obstructed by concretions of cholesterine or of resinous matter. In other instances they are entirely empty, or contain merely a little thin, pale fluid. Sometimes the surfaces of the liver adhere to the adjoining viscera, and collections of matter or large abscesses press upon them, or upon the bile ducts, or open into the latter, or into other parts. In a few instances the *hepatic veins* have been found more or less obstructed, or pressed upon by tumours or enlargements of adjoining parts. In one instance of jaundice connected with abscess of the liver, I detected inflammation of these veins, several of them being plugged up with lymph, or filled with pus. In rarer instances, hydatids are found in the liver, or attached to it. (See art. LIVER.)

20. *c*. The *gall bladder* often contains *calculi*, the number and size of which are very various. When one only is found, it is usually very large. The gall bladder may be distended with *bile*: in this case the fluid is much changed; being generally of a deep green colour, or greenish black, thick and ropy, and sometimes containing granular matter. In some instances, the accumulated fluid is of a pale orange colour, and thin consistence. A portion of fluid of this description, which was taken from a subject dead of tuberculated liver, jaundice, and dropsy, was examined by Dr. BOSTOCK, and found to consist of water, albumen, and a little colouring matter, without any of the usual biliary principles. STOLL found the gall bladder filled with a whitish serum. In other cases it is entirely or nearly empty. Sometimes marks of inflammation are observed in its coats. The last named author found them changed to a semicartilaginous state. FRANK, LOUIS, and ANDRAL met with ulceration of the internal surface, with softening of the coats of the gall bladder; and a similar case occurred to myself, where it contained gall-stones. ANDRAL found it softened and ruptured. Excrescences into its cavity have been noticed by BONET. Adhesions of it to the adjoining parts are occasionally observed. Its entire absence in this disease occurred to M. BOURGEOISE; but this is merely a coincidence. In a case of absence of gall bladder in a patient at the Infirmary for Children, there was no jaundice; and similar facts have been observed by others.

21. *d*. The *biliary ducts* are frequently obstructed, in some cases by gall-stones, in others by the pressure of tumours in the pancreas, mesentery, pylorus, or duodenum. The common duct is not infrequently obstructed by scirrhous or other tumours in these situations. In this case, as well as when it contains calculi, the gall bladder, and the duct above the seat of obstruction, are generally greatly dilated, and filled with thick, dark-coloured bile. This dilatation sometimes extends more or less throughout the ramifications of the hepatic ducts. In a case which occurred in my practice some years ago, and where both the common and the pancreatic ducts were completely obliterated by their inclusion in a large, hard, or scirrhous tumour, developed between the root of the mesentery, and head of the pancreas, — this latter being remarkably enlarged, — the gall bladder contained about twelve ounces of this kind of bile, and the ramifications of the ducts through the liver were much dilated. The coats of the ducts sometimes exhibit marks of inflammation, — are ulcerated, thickened and indurated, and the calibre of their canals are much reduced. In some instances, the ducts are entirely obliterated, and reduced to a thin fibro-cellular cord. This obliteration I have seen confined in one case to the common duct, in another to the cystic duct. In the latter instance, the gall bladder was enormously distended with a deep green viscid bile: the obliteration of the duct must have been subsequent to the accumulation of the secretion in this reservoir. STOLL, PORTAL, ANDRAL, and others observed a cartilaginous state of both the common and cystic ducts. LIEUTAUD, LUDWIG, and CHAPMAN found lumbrici in the common duct, in icteric patients.

22. *e*. The *stomach* is not infrequently seriously altered, particularly when the disease has been occasioned by intemperance, especially in the use of spirits. The pylorus in those cases is sometimes thickened, cartilaginous and greatly constricted (STOLL). — The *duodenum* is often, also, the seat of lesion, especially in the vicinity of the ducts. It is sometimes inflamed, thickened, softened, or indurated, ulcerated, and, in rare cases, apparently scirrhous. Tumors of various kinds have involved its coats, at the place where the ducts enter it, either entirely obliterating their apertures, or very greatly diminishing them. OECHY found this viscus remarkably dilated, so as to press upon the ducts. The *pancreas* is occasionally enlarged, scirrhous, or otherwise altered,— pressing upon, or obstructing, the ducts. Great enlargement of the *right kidney* has also produced this effect. The *spleen* is sometimes enlarged, or otherwise altered.

23. *f*. Alterations of the *vena portæ* are also met with in jaundice. M. HONORÉ found this vessel nearly impervious. It has been observed considerably enlarged throughout its ramifications, and congested with black blood. In a great number of icteric cases, the viscera adjoining the gall bladder are much stained by the exudation of bile through its coats. But this is an entirely *post mortem* appearance. — *Dropsical effusions* into the

various cavities are frequently met with, and occasionally coincident lesions in the *heart*, *lungs*, as well as in some one or more of the abdominal viscera.

24. It should not be overlooked, that each, or several, of the foregoing lesions have often been present without jaundice,— a circumstance which has led some pathologists to deny the origin of it in the presence of bile in the circulation; and that jaundice has existed in patients, in whom no organic lesion was detected after death, —an occurrence which has led physicians, since the times of HOFFMANN and MORGAGNI, to impute the disease, in some cases, to spasm of the biliary ducts, and induced others to view it as an occasional consequence of the accumulation in the blood of the materials of which bile is formed, owing to inaction of the liver. But there is every reason to suppose that undetected disease of the heart had existed in many of these, and had obstructed the return of blood from the liver.

25. In cases of jaundice, particularly in those of long standing, a yellow or greenish yellow tint, in different degrees, is usually observed in every texture and organ of the body, and in all the fluids and secretions, whether natural or morbid. The fat is usually of the deepest colour. The humours of the eye and the cornea are seldom or ever tinged. A case is, however, related in HORN's *Archives* (*Für Pract. Medicin.* b. vi. p. 341.), where they exhibited this change of colour. The yellow hue has rarely been detected either in the cerebral structure, or in the medullary tissue of the nerves; although instances have occurred to BARTHOLIN, MORGAGNI, and PORTAL, of its appearance in the former.

26. IV. OF THE PATHOLOGICAL RELATIONS OF JAUNDICE.—Jaundice is more or less intimately connected with one or other of the following pathological conditions: — 1. With an exuberant secretion of bile; — 2. With inflammation and abscess of the liver; — 3. With congestion of the liver and portal system; — 4. With chronic alterations of the structure of the liver; — 5. With spasm, or temporary obstruction of the gall ducts; — 6. With the passage or existence of gall-stones; — 7. With inflammation, obliteration, or compression of the biliary ducts, or gall bladder; — 8. With inflammation of the duodenum.

27. i. *Jaundice with Exuberance of Bile.*—This variety was first contended for by M. PORTAL, and afterwards by MM. CORNAC, ALIBERT, VILLENEUVE, and others. It has been referred to an excited state of the vital actions of the liver, particularly to the predominance of its secreting function. It is sometimes met with in temperate climates, during summer and autumn, especially those which apppoach nearest the tropics; but it occurs chiefly in warm or intertropical countries, and in those who live indolently and luxuriously or intemperately, or who are of a bilious temperament. It is generally preceded by supraorbitar headach, bitter taste in the mouth, loss of appetite, nausea, bilious vomiting, followed by a yellowish, or greenish yellow tint of the skin. The chief characteristic of this form of the disease is the absence of constipation, and the presence of bile in the evacuations, which are either natural, or more frequent than usual. I have seen it accompanied with slight bilious diarrhœa, with febrile action, or with a full or strong pulse. It may be presumed, that a portion of the bile is absorbed in this variety, during its course through the biliary passages, or through the intestinal canal, owing either to increased activity of the absorbing vessels, to the state of the bile itself, or to partial obstructions in its course through either of these parts. It is often complicated with dysentery, hepatitis, and bilious fevers, particularly in miasmatous and intertropical countries.

28. ii. *With Inflammation and Abscess of the Liver — Hepatic Jaundice,* SAUVAGES and CULLEN —*Icteritia Pyrexica,* ALIBERT.—Jaundice may accompany any form of inflammation in this organ, particularly when the internal structure is the seat of the morbid action. Although inflammations of the liver are so extremely frequent in India, yet jaundice is a comparatively rarer attendant on them there, than in this country. In Continental countries, this association of jaundice is very common. The rare occurrence of jaundice, as a symptom of hepatitis, in India, is perhaps owing to the liberal use of calomel in the treatment of hepatic affections. But it is when abscess forms in the liver, that we most frequently find jaundice supervene on hepatitis. In a very large proportion of the cases of abscess of this viscus, detailed by M. ANDRAL (*Clinique Médicale*, t. iv.), jaundice appeared;—and a similar frequency of connection has occurred in my own practice. Out of six cases of abscess of the liver to which I was called, in 1826 and 1827, in consultation, four had jaundice during some period of their progress, subsequently to the occurrence of the symptoms indicating the formation of matter.

29. In almost every case of jaundice from inflammation or abscess of the liver, the nature of the disease is very readily recognised. The symptoms of hepatitis are well marked, particularly the pain, uneasiness, and tumefaction in the right hypochondrium and epigastrium; the scanty, dark, or brownish urine; the dry cough; the pain in the right shoulder, clavicle, and side of the neck, or under the right scapula, &c.; and the full and frequent pulse, &c. (See LIVER—*Inflammation of*, and *Abscess of*.)

30. iii. *Jaundice from Congestion of the Liver —Intemperies calida, of* SENNERT — *Icterus a Plethora*, of F. HOFFMANN. — The connection of this state with jaundice has been admitted by SAUVAGES, GRIMAUD, BANG, PORTAL, CORNAC, and MANOURY. It is generally observed in persons of the bilious and sanguine temperaments, who live luxuriously or intemperately, and either pursue sedentary occupation, or are deprived of requisite exercise. It is chiefly to this and the preceding pathological states, that we are to refer the instances of jaundice, which take place from the suppression of the menses, or of accustomed discharges, particularly the hæmorrhoidal, and from the retrocession of gout and rheumatism. Active congestion of the portal vessels is connected with more or less plethora, and congestion, of all the vessels that convey blood into the vena portæ. The blood circulates with difficulty through the liver; and the bile, which is formed, generally in great abundance, owing to the highly venous state of the blood, often is retarded and accumulated in the ducts, during its course to the gall bladder or duodenum. Owing to this retardation or obstruction, a portion of it is absorbed, probably by the radicles of the hepatic veins, as they pass out of

the granular structure, where the biliary secretion is performed, and the ducts take their origin. It is obvious, that obstructions of the return of blood from the liver, owing to *organic lesion of the heart*, will also give rise to this form of the complaint, and that such occurrences are not rare.

31. iv. *With Chronic Organic Alterations of the Liver — Aurigo ab Obstructione*, SAUVAGES—*Icteritia Apyrectica*, ALIBERT. — In this form of the disease, the accession of the jaundice is generally very slow; the colour is livid or dusky, permanent, and often extremely deep, approaching sometimes a greenish or olive hue, forming the green or black jaundice of several authors. The organic alterations vary remarkably; consist of those already enumerated (§ 18. *et seq.*); and are often complicated with lesions of the adjoining viscera, or with dropsical effusions. In the majority of these cases, the bile seems either to be secreted with morbid properties, and to be conveyed into the circulation almost as soon as it is secreted; or, what appears still more probable from the morbid appearances very frequently detected, the materials of which bile is formed, are not combined by the liver, and converted into bile, but, having experienced the preparatory change, merely pass onwards from the granular structure of the liver into the radicles of the hepatic veins, and, circulating with the blood, tinge the textures of the body, particularly the rete mucosum. That there is sometimes no due secretion of bile, is shown by the secreting structure of the liver being often found either completely destroyed, or so altered, as not to admit of the demonstration of its peculiar texture; and also by the pale, straw-coloured, tasteless, and albuminous serum found in the ducts (§ 19.); or by their empty, atrophied, and pale states. This variety of jaundice is generally the consequence of intemperance, or of residence in miasmatous districts, or in warm climates. It is often observed in persons of middle age, or somewhat further advanced in life; and is preceded by chronic dyspeptic or bowel complaints; and by indications of disorder in the liver, often of many years' duration.

32. v. *Jaundice from suspended Function of the Liver, or from Spasm of the Ducts — Icterus a Spasmo*, HOFFMANN. — That jaundice ever proceeds from spasm of the gall ducts, has been denied by several writers. CULLEN, POWELL, ANDRAL, and JOURDAN have, however, contended, that spasm of the ducts sometimes occurs, and produces the disease, especially in cases arising from mental emotions, and the irritation of the upper portion of the intestinal canal. Sudden mental affections, — as fright, terror, rage, anger, disappointment, excessive joy, — frequently occasion a most painful and oppressive sensation at the epigastrium, faintness or difficulty of respiration, and paleness of the countenance. This state is occasionally followed almost instantly, but always in a very short time, by yellowness of the face and surface of the body. In some cases, the functions of the brain are much disturbed, and a febrile state of the system takes place. In others, nausea, vomiting, &c., in addition to the icteric affection, are produced. In these, the moral affection influences the state of the nerves proceeding from the solar plexus; and hence the morbid sensations referred to the epigastrium. The slow depressing passions of the mind were also supposed, particularly by VILLENEUVE and MANOURY, to occasion spasm of the ducts; and physical pain was considered by M. PORTAL occasionally to operate in a similar manner. When jaundice is connected with hysteria, epilepsy, or hysteralgia, HOFFMANN referred it to the same cause. Even the bites of venomous reptiles were supposed by MEAD and BOSQUILLON to produce icterus in a similar way. BARTHOLIN, LANZONI, and VAN SWIETEN have imputed the rare occurrence of jaundice from the bites of dogs, or other animals, also to this circumstance.

33. Cases of this kind admit of a different explanation from that proposed by the above writers. It is more probable that violent mental emotions, and that sedative poisons taken into the stomach, or inserted into the tissues, suspend the organic nervous influence, and thereby arrest the functions of the liver, than that they occasion spasm of the ducts and adjoining parts. That this latter state, however, may occur, I will not deny, especially when nausea, retchings, or vomiting are added to the icteric affection, or when the duodenum is irritated in the vicinity of the ducts. The more or less complete paralysis of the biliary organs, produced, for a time, by the causes alluded to above, favours the absorption or passage of bile into the circulation, and the accumulation in the blood of the elements of which bile is formed.

34. The principal characteristics of this variety of jaundice are its rapid appearance and short duration. It is seldom deep, and generally is of a pale yellow, or bright yellow hue. It often disappears without the aid of medicine; and the treatment resorted to, in such cases, thus obtains a reputation it does not deserve.

35. vi. *With Inflammation and Obliteration of the Ducts and Gall Bladder.* — The ducts may be inflamed, and obstructed in consequence of the turgescence accompanying the inflammation, or as MM. JOURDAN and BRESCHET have stated, of some degree of spasm attendant on it. The inflammatory action may also extend to the gall bladder, or be almost entirely limited to it. Inflammation and its consequences have been observed after death in one or other of these situations, both in connection with, and independently of, jaundice; and have most probably been induced by the irritating properties of the bile passing through the ducts, or by the extension of inflammatory action from the internal surface of the duodenum to that of the common duct. In either circumstance, the ducts above the obstruction may become dilated, although not to the extent observed after obstructions of a more permanent kind. If, however, the consequences of inflammation furnish a permanent obstruction, this result will often occur.

36. In cases of this kind, the patient has more or less fever, dry skin, thirst, and anorexia or nausea, or even retchings. Pain is felt in the right hypochondrium, particularly under the exterior and inferior angle of the right shoulder blade, extending to the epigastrium, on the right side of which, or beneath the extremities of the right false ribs, a pyriform moveable tumor is sometimes felt. The stools are without bile. More or less fulness of the right hypochondrium and epigastrium is also often present, sometimes with pain not only in the above situations, but also in the back, and in distant parts. These

symptoms may continue an indefinite period with various degrees of severity; and may subside with the jaundice after a time, upon the resolution of the inflammation.

37. In less favourable cases, owing to the thickening consequent upon the inflammation, or to the exhalation of coagulable lymph from the internal surface of the inflamed duct, together, perhaps, with spasm, its canal becomes permanently obstructed, and the vessel is ultimately reduced to a fibro-cellular cord. In these, the jaundice generally continues, and all the digestive and assimilating functions languish; death ultimately taking place.

38. vii. *Jaundice from Compression of the Ducts by Tumors, &c.* — The lesions of the adjoining viscera already referred to (§ 21.), particularly the formation of scirrhous and other tumors in the pancreas, pylorus, mesentery, &c. involving and obliterating the ducts; enlargement, and disease of lymphatic glands in the vicinity of the common duct; engorgement or inflammation of the pancreas, occasioning compression of this duct; great enlargement of the right kidney; distension of, or accumulations of hardened fæces in, the cæcum and colon; the gravid uterus, &c.; may occasionally interrupt the passage of bile into the duodenum, by pressing upon the ducts, and thus occasion jaundice. It is only by pressing scybala, or hardened fæces lodged in the cells of the colon, upon the duodenum and common duct, that the gravid uterus causes jaundice. It is extremely difficult to ascertain the presence of any of those causes during the life of the patient; although suspicions of the existence of some of them may be entertained from the *tout ensemble* of the symptoms, and the effects of remedies. When jaundice arises from accumulated fæces, the effects of purgatives will often demonstrate its origin. The frequency of this cause has been justly insisted on by Van Swieten and others.

39. viii. *Jaundice from Calculi in the Ducts — Aurigo Calculosa*, Sauvages. — Calculi lodged in the ramifications of the hepatic duct, may occasion, or rather be connected with, jaundice; but their presence in the common and cystic ducts is a more frequent cause. They are more rarely found in the hepatic duct, but they may produce the disease in that situation. Their impaction in the cystic duct, even when the gall-bladder is filled with dark bile, does not uniformly occasion this affection, as shown by numerous observers. When they obstruct the common duct for some time, this effect very generally, although not always, follows; and the symptoms, particularly when the calculus approaches to, or is passing through, the coats of the duodenum, are often very well marked. In many cases, however, calculi pass without giving rise to jaundice, or, indeed, to any very prominent symptom or ailment; and in others, they pass with violent sufferings, and yet no jaundice is occasioned.

40. More commonly the occurrence of jaundice from the impaction of calculi in the bile ducts, particularly the common duct, is attended with pain, weight, pressure, and uneasiness towards the epigastrium, especially when the patient lies on the left side. Acute, colicky, and spasmodic pains are felt at intervals in the region of the duodenum, under the right shoulder blade, and extending to the hypochondrium and epigastrium, followed sometimes with nausea, vomiting, and a sense of heat at the stomach. Occasionally, a tumor is detected between the epigastrium, hypochondrium, and umbilicus. When the fits of pain are violent, the patient often complains of vertigo, of the extension of the spasm to the abdominal muscles, and even to the extremities. There is seldom only one calculus, generally several; and the attack is often renewed upon the passage of each, with a varying degree of severity according to their size. The jaundice in these cases may precede, or even follow, the painful symptoms. Upon the discharge of the calculi, these symptoms quickly subside; but the jaundice disappears only slowly, or even persists for some time.

41. The production of jaundice by the presence of *worms in the ducts* has been stated by several authors, and doubted by others. Dr. Chapman refers to a preparation demonstrating the fact in the museum of the University of Pennsylvania.

42. ix. *Jaundice from Inflammation or Congestion, &c. of the Internal Surface of the Duodenum.* — Various deleterious ingesta, acrid salts and poisons, emetics, and purgatives, articles of food which offend the stomach, drinking cold fluids, &c. when the body is overheated, or exposure to cold, have been supposed by Broussais and his followers sometimes to occasion so much inflammation and turgidity of the mucous membrane of the duodenum and adjoining parts, particularly about the orifice of the ducts, as as entirely to occlude it, and thereby to give rise to jaundice. That this takes place in rare cases, or that congestion in this situation will have the same effect, may be admitted, although satisfactory proofs of the circumstance cannot be readily furnished. The inflamed and turgid state of the duodenum may be limited to it, or may even extend to the ducts, as stated above, and thus cause obstruction (§ 35.). The jaundice accompanying bilious fevers and dysentery may depend upon this pathological state.

43. It is probable that this variety of jaundice will be attended by very nearly the same symptoms, as characterise that proceeding from inflammation of the ducts; but that, unless the ducts become implicated, the jaundice will be less marked, and of shorter duration, than when they are inflamed. The presence of nausea, vomiting, or of diarrhœa, or of sympathetic phenomena, in such cases, furnishes but slight evidence of this pathological state. Oechy states that he has seen the duodenum dilated so as to press upon and obstruct the ducts, in a case of jaundice; but there was probably some other lesion upon which the jaundice more immediately depended than upon this.

44. Various other morbid states of the duodenum may occasion jaundice, particularly the accumulation of mucus on its surface, or about the orifice of the ducts; and various organic lesions seated in this part, or extending to it, or to the ducts from adjoining viscera. The former of these is probably not an infrequent cause of the slighter and less enduring kinds of jaundice, particularly in infants (§ 53.), children, and young persons.

45. V. Jaundice from Suspension or Arrest of the Secreting Function of the Liver — *Pseudo Jaundice.* — In this form of dis-

ease, which cannot be considered as a variety of true jaundice, bile is not secreted or formed from its elements in the blood, owing either to a paralysed or suspended state of the vital action of the liver, or to disorganisation of it to an extent entirely subversive of its functions. In either case, the elements, from which the bile is formed, accumulate in the circulation, change the colour of the serum and of the blood generally, and thus render the skin lurid or murky. In a further advanced stage of the disorder, certain of the principles, or even the colouring matter, of bile are fixed, or deposited, in the tissues, imparting to them either a darker, or a more jaundiced hue. (See art. Disease, § 108.) The slighter states of this form of disorder frequently accompany torpor of the liver, as observed in this country; and the more marked states of it often occur in miasmatous and warm climates. In various fevers also, and in some epidemics and pestilences, the action of the liver is entirely suspended; the surface becoming dark or lurid. This takes place to a remarkable extent in *pestilential cholera*, and is heightened by other circumstances.—When this state of disease arises from disorganisation of the liver, its accession is slow, and the discoloration of the surface often proceeds through a dirty or lurid hue to the greenish or greenish black colour about to be noticed. In either of the pathological states producing the discoloration, there is an entire absence of bile from the stools; and the secretions from the kidneys and skin are dark, or otherwise altered, from the presence of the elements or of the principles of bile.—When the vital power of the organ is suspended, there is seldom pain or other prominent symptom detected in the region of the liver. There is even sometimes an unusual absence of symptoms indicative of acute hepatic disease, excepting the complete suspension of the functions of the organ. But when the structure of the viscus is so altered, as to be incapable of discharging its offices, the antecedent disorder, as well as the attendant phenomena, will generally indicate the pathological relations of the affection, aided by the history of the case, and a knowledge of the causes. The alterations of the liver, already noticed in connection with true jaundice (§ 19.), will occasionally, when carried to the highest pitch, give rise to this form of the disease, or to the next to be noticed (§ 46.).

46. VI. Of Green or Black Jaundice—Μελαίνα νοῦσος, Grec.—*Icteritia nigra*, Forestus—*Icterus viridis, Melas Icterus, Melanchorus*, Fennel, et Var. Auct.—*Icterus Melæna*, Good—*Green Jaundice*, Baillie—*Black Jaundice.*—This is merely the extreme grade of the disease. It was first described by Aretæus; but although somewhat circumstantially noticed by several authors, the first satisfactory account of it was furnished by Dr. Marcard and Dr. Baillie. The colour of the skin varies in depth from a yellowish green, to a deep green or olive colour. The temperature of the surface is not increased; but burning heat is felt in the palms of the hands, and soles of the feet. The evacuations are often pale; but sometimes they are dark coloured, pitchy, with grumous coffee or chocolate like matter, and slight diarrhœa. The urine is occasionally clear, but oftener very dark and loaded, tinging the linen of a dark, tawny hue. The patient is greatly depressed, physically and morally, and complains of anxiety at the epigastrium, and of tenderness either in that situation, or in one or both hypochondria. A sensible enlargement of the liver is often felt, and sometimes also of the spleen. In a case which I lately treated, both these viscera were very remarkably enlarged. But an opposite state as frequently obtains. The pulse is usually natural or slow. Vertigo, sickness, and vomiting of a green, acid colluvies, occasionally are present. In the intervals, the appetite is either capricious, or but little affected.

47. This form of jaundice seldom attacks young persons. It is commonly met with in the aged or advanced in life, and is much more frequent in males than females, particularly in those who have lived long in unhealthy intertropical countries, or who, with great anxiety and fatigue, have been tried by frequent changes of climate. It is generally connected with the most chronic and profound organic lesions of the liver, especially those which involve, or destroy, its secreting structure, and obliterate the minuter ramifications of the ducts through the organ. It seldom admits of more than a partial removal, but terminates in either a fatal exhaustion, or with coma, apoplexy, epilepsy, or palsy. Abdominal dropsy frequently takes place in its progress. Its course, in its slighter grades, is generally slow,—sometimes continuing, with various fluctuations, for seven or eight years; but when the colour becomes very deep, it often terminates rapidly, in either of the above ways.

48. When green jaundice is attended with pitchy, or dark, grumous evacuations, there is generally either a congestion of the spleen, and of the portal system of vessels, with the secretion of a dark-green unhealthy bile, a portion of which is absorbed, and deposited in the structures, particularly in the *rete mucosum*; or a congested and hæmorrhagic state of the mucous membrane of the stomach, duodenum, and upper part of the intestines, owing to the obstructed circulation through the liver; but both pathological conditions may be present, giving rise to an exhalation of venous blood from this membrane, and thereby to the dark and grumous motions. The mucous membrane in these situations is usually found, on dissection, dark-coloured, mottled, softened, ecchymosed, or its venous capillaries loaded. The other viscera, particularly the *liver* and *ducts*, present the appearances already described (§19, 20.).

49. VII. Complicated Jaundice. — By this appellation, I mean the occurrence of jaundice — 1. during the course of some other disease; and, 2. upon the subsidence or suppression of a pre-existing disorder, which may not only be concerned in its appearance, but also in its removal or recurrence. — *A. The maladies during the progress of which jaundice most commonly occurs*, are chiefly those fevers which implicate, in a more or less marked manner, the liver and digestive mucous surface. Thus it is frequently observed in the course of *gastric*, and of *bilious remittent fevers*, of both an inflammatory or low character. It is also not infrequent in connection with *ague*; and, owing partly to this circumstance, it has been said by some authors to recur *periodically*. Its appearance in the course of *typhus fevers* is

comparatively rare. MENDE has sometimes remarked it; and CHEYNE notices its infrequency. When it occurs during *fevers*, it may be imputed either to diminished excreting activity of the liver, and the rapidity of absorption of a portion of the secretion, or to obstruction in the way of the opening of the ducts into the duodenum, from a tumefied, congested, or inflamed state of its mucous surface. In some cases, both states may contribute; whilst in others, the secretion takes place more rapidly than it is conveyed into the bowel, although its flow is in no respects impeded. The secreting function of the organ may also be much diminished, — the constituents of bile being left in the blood.

50. We occasionally also observe jaundice in connection with *organic lesions of the heart, hysteria, dropsy, melaina, delirium tremens, apoplexy, palsy*, and *epilepsy*. — When it is complicated with *hysteria*, the urine is usually very abundant and limpid, and the complication is of a much less serious nature, than with the other maladies just named, which more frequently terminate unfavourably, when thus associated. — When it occurs in consequence of interrupted circulation through the heart, dropsy, or hæmorrhage, often also supervenes. We also not infrequently hear of it in connection with certain *cachectic* and *malignant affections* of a chronic character. Several of the states, which are usually attributed to jaundice, in the last stages of these maladies, are not true jaundice, and do not proceed from the presence of bile, or of its constituents, in the circulation; but from the absorption, and admixture with the blood, of a portion of the morbid matters formed in the seat of the local or malignant affection, or of some of the morbid secretions retained in the digestive canal (§ 54.).

51. *B*. Jaundice sometimes follows the subsidence or suppression of other diseases, and is even removed by the reproduction of certain of them: it often appears after periodic fevers, and occasionally upon the sudden arrest of these fevers by large doses of cinchona or of sulphate of quinine, especially when these are exhibited before morbid secretions or accumulations have been evacuated. In such cases, the jaundice depends chiefly upon superinduced congestion or inflammation of the internal structure of the liver. The stoppage, also, of *hæmorrhoids*, sometimes gives rise to jaundice, by inducing these morbid conditions of this organ; the re-establishment of the hæmorrhoidal flux generally removing the congestion, and favouring resolution of the inflammatory action. A similar result occasionally occurs from obstruction of the catamenia, and from suppression of dysentery, diarrhœa, of gout, and of rheumatism, especially when morbid secretions, and collections in the digestive canal, have not been removed. The relation of gout to several of the pathological states which give rise to jaundice, and the conversion, in some instances, of the one into the other, have been remarked by several experienced physicians; and a similar connection has been noticed between this latter and the other diseases just named.

52. VIII. TRAUMATIC JAUNDICE. — Jaundice sometimes occurs after concussion of the brain, and severe injuries of the head. The influence which the brain exercises on the functions of the liver, has been oftener the subject of remark than of explanation. It has usually been imputed to sympathy; or, in other words, the morbid relation has been stated, and our ignorance of its nature admitted at the same time. Severe injuries, when they suspend the energies of the brain, may also lower the secreting and excreting functions of the biliary apparatus, by diminishing its nervous energy, and placing it in a state which (§ 33.) favours the absorption of bile into the circulation, independently of any very obvious change in the structure of the liver or ducts. There is, however, every reason to suppose that jaundice subsequent to severe injuries, particularly of the head, sometimes results from phlebitis, originating in the seat of injury, or from the passage of purulent or other morbid secretions thence into the circulation. In either case, purulent collections will sometimes form in the liver, and give rise to jaundice by pressing upon the hepatic ducts and veins. Severe injuries in other situations than the head, — as compound fractures, &c., — will sometimes also produce the same results. That purulent collections form in this viscus, under these circumstances, almost as frequently as in the lungs, is a fact fully established by the observation of the author, and other pathologists; and although jaundice is not a constant, yet it is a very general, attendant upon them. — Injuries, wounds, &c., which implicate any part of the biliary apparatus, occasionally produce jaundice, by the immediate change they induce in the functions or structure of it; and it is not unlikely that, in some of the instances where the injury seemed to have been inflicted on the head, the liver actually had sustained the chief injury, or had experienced a concussion, of which jaundice was the consequence, either with, or without, inflammatory action diffused through the substance of the organ. — When jaundice follows blows or injuries on the region or vicinity of the liver, and especially if it be attended by a dull or aching pain, inflammation extending through the substance of the organ may be inferred to exist.

53. IX. INFANTILE JAUNDICE — *Icterus Infantum* — *Icterus Neonatorum* — *Yellow Gum*. — Jaundice is usually slight during the infantile age. It is generally attended with languor, drowsiness, or debility; and may be referred to the following pathological states: — 1st. To the stagnant and altered blood contained in the umbilical vein, changing the state or colour of the serum; — 2d. To a partial absorption, from retention of the meconium; — 3d. To saburræ accumulated in, and absorbed partially from, the duodenum and small intestines; — 4th. To obstruction of the aperture of the ducts from viscid meconium, and mucous sordes; — 5th. To spasm of the excretory biliary ducts (BEAUMES); — 6th. To a superabundance of the biliary secretion: — and, 7th, To obstruction, or a paralysed state of the secreting structure of the liver. The first, second, and third of the above sources may so change, or deepen the colour of, the serum of the blood, independently of any absorption of bile, as to give rise to the yellow state of the cutaneous surface frequently met with in infants. — Superabundance of the biliary secretion may exist in more than one respect; — this fluid may be secreted in unusually large quantity, or it may have accumulated in the ducts and gall bladder during the period immediately antecedent to birth, or it may have flowed into the duodenum in very large quantity, and

mixed with the secretions of the digestive mucous surface, forming a meconium, abounding more than usual in biliary principles, instead of the bland albuminous fluid, which is usually formed for the purpose of assisting fœtal nutrition and growth.—A paralysed state of the secreting structure of the viscus has been ascribed by M. BEAUMES to injury sustained by the brain during child-birth, but it may exist independently of this cause. One or more of the above pathological states may give rise to jaundice in infants, which is generally mild, and readily removed by medicine. It usually occurs very soon, or within the first week, after birth, particularly when the bowels have been neglected; but it may appear at any period. When it comes on within the first week after birth, it seldom continues above four or five days, and is usually slight.

54. X. OF CACHECTIC OR SPURIOUS JAUNDICE.—Morbid secretions readily pass into the circulation in the course of various malignant, pestilential, and cachectic maladies, and impart a dark or dirty hue to the serum, and otherwise affect the blood, producing a similar tinge in most of the tissues,—the cutaneous surface closely approaching the colour of jaundice, but differing from it, in being more lurid and dusky, and in the absence of biliary obstruction. In low states of vital power, morbid secretions may be absorbed from the digestive canal, and thus affect the circulating fluids; and in a similar state of vital power, secretions or morbid matters in other situations, as from the uterus in the puerperal state, from abscesses, from disorganisation of the cellular tissue, &c., may pass into the circulation, and impart a lurid or jaundice-like tinge to the external surface and other parts. The contamination of the fluids and soft solids in the latter stages of chronic malignant maladies, as carcinoma, fungoid disease, is also attended by a change of the cutaneous surface resembling jaundice, but essentially differing from it. For the hue of the skin in these maladies proceeds from the admixture of morbid matters absorbed from the seat of local mischief, vitiating and tinging the serum of the blood of a deeper hue, and thereby rendering darker the *rete mucosum*; and not from the presence of bile, or even of its chief constituents, in the circulation (§ 63. *b.*). The lemon, yellowish, or even the yellowish green hue of jaundice, is very different from the lurid, dirty, or murky appearance of the surface consequent on these maladies. In these, the pale or clayey state of the stools, and the saffron tinge communicated by the cutaneous and urinary secretions in jaundice, are wanting, whilst the alvine evacuations are usually dark, morbid, and very offensive.

55. The appearance of the cutaneous surface in *chlorosis* resembles a slight attack of jaundice; and it is necessary not to mistake the one for the other. This will be avoided by attending to the age, the functions of the uterus, and to the evacuations. In chlorosis, the discharges are more natural than in jaundice, the perspiration and urine not communicating to the linen the saffron tinge observed in the latter complaint. In chlorosis also, and, indeed, in the latter stages of chronic malignant diseases, the waxy state of the integuments, and the smallness of the vessels, indicate a deficiency in the quantity, as well as in the quality, of the blood.

56. Instances, however, may occur, in which the morbid colour of the surface is increased in the course of cachectic and malignant maladies, by the absorption of bile into the circulation, or by the accumulation in it of the elements or principles of which bile is formed, owing to torpor of the liver. Indeed, this latter cause of heightened discolouration of the surface, in the course of these maladies, is by no means rare; for the liver largely partakes of the depressed state of vital power characterising them. When malignant disease occurs either in the substance of the liver, or in parts near the capsule of GLISSON, it is generally associated with jaundice, which gradually deepens from a lemon hue to a dark or dusky green colour, the urine assuming a greenish brown tint, and the patient sinking from exhaustion and coma. This association has been well illustrated by the recent researches of Dr. BRIGHT, which have appeared since this article was written.

57. XI. OF THE DISTINCTIONS MADE BY AUTHORS.—Jaundice has been variously *distinguished*—into *Idiopathic* and *Symptomatic; continued* and *recurrent* or *periodical; febrile* and *non-febrile;* and into *Yellow* and *Black Jaundice — Icterus* and *Melasicterus*. It has been further distinguished into *Inflammatory, Plethoric*, and *Nervous;* into *sporadic, endemic*, and *epidemic;* into the *mild* or *benign*, and the *malignant* or *pernicious*.—Jaundice is generally *sporadic;* but it is *endemic* in some localities, particularly in those which are low, humid, and warm; and which abound in terrestrial exhalations, as in some situations in the South of Europe, and among Europeans residing in various parts within the tropics, particularly in the Eastern hemisphere. It has likewise been so prevalent at some periods, especially in autumn and early in winter, even in temperate countries, as to have been considered *epidemic*.

58. *The malignant* or *pernicious* form of jaundice, noticed by writers, sometimes occurs in warm climates, and in marshy districts in the South of Europe, particularly during autumn, when low remittent or bilious fevers are prevalent. It entirely depends upon a general or diffused inflammation, or inflammatory congestion, of the liver, or both of the liver and spleen, with retention of the biliary and other secretions, great depression of vital power, deep or dark green discolouration of the skin, very quick pulse and febrile disturbance, terminating rapidly, sometimes with intestinal hæmorrhage, and always with delirium and profound coma. This form of jaundice is not, however, confined to the climates and localities just specified; as I have been called, within a short time, to two cases in London, which presented all the characters of the most *pernicious* state of the disease, and which terminated fatally in four or five days.

59. *Idiopathic* or *primary jaundice* has been denied, first, by BOERHAAVE and STOLL, and subsequently by PINEL, LOUYER VILLERMAY, GRIMAUD, and others; whilst it has been contended for by numerous writers. The truth is, that the difference between idiopathic and symptomatic, particularly as relates to jaundice, is often merely verbal, and is in a great measure relative. In a very strict sense of these terms, jaundice is never a primary complaint; whilst it may frequently be viewed as such, if we consider it, with many other maladies, as constituting the principal, and one of

the earliest morbid conditions, which can be recognised by our senses. According to this more obvious mode of distinction, the occasional occurrence of idiopathic jaundice, as after mental emotions, cannot be disputed. The variety usually attributed to spasm of the ducts, but which I have considered as depending rather upon a change in the state of organic nervous influence and functions of the liver than upon spasm, may, conformably with this view, be considered idiopathic.

60. The *classifications* and *distinctions of jaundice* by nosologists and authors require no further notice. Indeed, they do not deserve the space they would occupy, especially as Sauvages adduces *forty-six species*, arranged, according to the various causes, pathological states, and associations, which the complaint presents. Even Villeneuve has divided it into *thirteen species*, several of which are subdivided into many *varieties*, which do not admit of any distinction in practice.

61. XII. Prognosis.—The prognosis necessarily varies with the age, sex, temperament, and habit of the patient, and the pathological relations and complication of the disease. — *A.* It is generally more *favourable* in young, than in old, subjects; and in those, in whom the energies of the frame are sufficient to bring about a return to the healthy functions, than in persons of a broken-down constitution, and with disorganised viscera. If it occurs in females from plethora, occasioned by the suppression of the menses, previous to the climacteric period; if the health has not been previously much affected, — if the abdominal viscera betray no marked disease, — if the respiratory function is unembarrassed, the heart's action regular and natural, and the vital energies not materially depressed; if the colour does not progressively deepen; if it proceed from the sudden, and violent emotions of the mind, as anger, fright, &c., or from bodily pain; if it arise from articles of diet or of medicine, which have disagreed with the digestive organs; if it depend upon plethora of the portal system, without inflammation or abscess, or on the passage of calculi along the ducts, in persons not far advanced in age, nor greatly debilitated; if a repelled eruption or suppressed discharge return; if the alvine evacuations are not much changed from their natural colour, or when the biliary secretion reappears; if the discolouration originate in temporary obstruction or pressure on the ducts, as in pregnancy, distension of the duodenum or colon; if the epigastrium and hypochondria are not constantly painful, or tender upon pressure; and if the disease seems to proceed from the more temporary causes of obstruction in the duodenum, or from spasm; the prognosis may in general be *favourable*; — yet I have seen jaundice exist in these circumstances, and where there seemed no reason to infer an unfavourable issue, and coma has suddenly appeared, and quickly carried off the patient.

62. *B.* An *unfavourable* prognosis, on the other hand, or, if not strictly unfavourable, a very guarded opinion, should be given, when this affection occurs after the cessation of the menstrual periods, or in aged females, or when it is caused by debauchery and intemperate indulgences, particularly in spirituous liquors. If symptoms of organic lesion of the viscera attend it; if the epigastrium and hypochondria be tumid, tender, and constantly painful, with heat of the palms of the hands and soles of the feet; if the respiratory function be impeded, or the circulation through the heart be irregular or obstructed; if the energies of life be depressed; if chronic disease have preceded the discolouration of the surface; if the colour deepen, be of long standing, and particularly if it be of a dark green hue; if it take place from the continued operation of the same cause, as grief, anxiety, and the depressing emotions; if the urine be small in quantity, white, or albuminous, or very dark, turbid, thick or blackish; if there be indications of supervening dropsy; if a colliquative form of diarrhœa supervene, or very dark, grumous, or pitchy evacuations, or vomitings of a nearly similar matter; if the affection be of long duration, and particularly if it be associated with dropsical effusions; if hiccup, with tumefaction of the epigastrium and hypochondrium, or a tympanitic state of the abdomen, be present; if delirium, delirium tremens, mania, epilepsy, lethargy, coma, paralysis, convulsions, or apoplexy occur; if intestinal hæmorrhage, or hæmatemesis, take place; if the jaundice proceed from calculi in aged persons, or appear after repeated attacks of ague or remittent fevers, and from continued melancholia; if it be accompanied with great depression of the mental and physical powers; if marked cachexia, and great emaciation, be present, and especially if it be complicated with internal or external malignant disease, a very unfavourable prognosis should be given.

63. XIII. Remote and Proximate Causes. — The chief causes have been stated in what has been advanced respecting the pathological relations of jaundice. — *a.* It is obvious, that the more *remote* causes are those which induce the alterations, of which the discolouration is a symptom. These are fully detailed above (§ 15.), and in the articles Concretions — Biliary; Duodenum; Gall Bladder and Ducts; and Liver — *Diseases of*. Those, which most frequently induce this complaint, are — habitual excitement of the liver, duodenum, and digestive organs generally, by too rich, too stimulating, or too much food, or by spirituous or intoxicating beverages; sudden and violent mental emotions; anxiety, or the depressing passions; high ranges of temperature, indolence, and full living; vicissitudes of temperature; the ingestion of cold fluids when the body is perspiring; miasmata or exhalations from the soil, especially in connection with humidity of the air; suppressed discharges and accustomed evacuations; interrupted circulation through the heart, occasioning congestion in the vena cava and hepatic vein; previous disease, particularly periodic fevers, &c.; whatever depresses the energies of life, and at the same time favours internal visceral obstruction; and the organic changes already noticed.—*b.* The *proximate* cause of jaundice may be stated to be the passage of the colouring or other principles of bile into the circulation, and the consequent discolouration of the skin and other tissues, heightened in some of the varieties by the accumulation in the blood of the elements of which bile is formed.

64. XIV. Treatment.—There are few diseases which require so much discrimination, as to the *indications* and *means of cure*, as jaundice. It

proceeds in different cases, as shown above, from so many different pathological states, and sometimes from so many combinations of them, that the utmost attention and practical acumen are necessary to ascertain the morbid conditions and peculiarities of the case, and to determine what is most efficacious in removing them. It is requisite not merely to guard against vascular excitement on the one hand, and vital depression on the other; but in many cases, also, to prevent or to remove both, as being the more immediate causes of the obstructed secretion or excretion of bile. In all cases, the states of general and local organic nervous power, as well as of general and local vascular fulness or action, must claim particular attention; and, in many, it will be found requisite to aid the former, whilst we diminish the latter. In any circumstances, it is very difficult to ascertain what are the effects of remedies upon the circulation and functions of the liver; for much of what has hitherto been said and written upon the subject, has been characterised by dogmatism, rather than by truth, — by vague assertion, unsupported by evidence. Some of the medicines, which have been supposed to excite the liver, probably operate by removing slight obstructions from the mouth of the common duct, by reducing vascular turgescence in the duodenum, and carrying off mucous collections; and others, which have been viewed as inert, as respects this organ, have as great influence upon its functions, as those whose effects have been considered specific. The operation of medicines in affections of the liver so much depends on the state of vital activity and of vascular action, on the extent to which biliary collections may have formed, and on the facilities to its excretion, that facts are rarely observed with that degree of precision in all these relations, which should entitle them to confidence, or to be made data for practical inferences.

65. i. *Jaundice from an exuberant Secretion of Bile*, there being no evidence of its obstruction, is not so frequent in this, as in miasmatous and warm climates. In these especially, the treatment must have due reference to the remote causes, and to the more immediate source of the biliary exuberance. In temperate climates, and in European constitutions, this state of the biliary function is connected with biliary remittent fever, and is most appropriately treated by the means most serviceable for the constitutional affection; but it sometimes continues, or returns, after the fever has disappeared. In these cases, as well as in those where it presents a more idiopathic character, there is every reason to infer the presence of active circulation in, or vascular determination to, the liver, probably with increased activity of the absorbent function. For them, moderate *local depletion* from the margins of the ribs, or from below the shoulder blades; *cooling diaphoretics*, especially the nitrate of potash, the solution of acetate of ammonia, or subcarbonate of soda, and spirits of nitric æther in camphor mixture; *emollients* and *demulcents*; soothing enemata and *diluents*; are the most efficacious means, particularly when the causes no longer exist, or when the patient is removed from the influence of miasmatous exhalations, or enjoys a dry and pure air.—The *diet* in these cases should be very spare, and consist of mucilaginous and farinaceous substances; animal food should be taken sparingly and cautiously during convalescence, and stimulating beverages entirely relinquished.

66. ii. *Jaundice from Inflammation of the Substance of the Liver* is more frequent than is generally supposed. It is often merely an exalted state of the former variety; the vascular disorder having advanced to such a pitch, as to obstruct the secretion or excretion of the bile, owing to the general turgescence of the vessels, and consequent pressure on the minuter bile ducts; and it is most frequently observed, when the internal structure of the organ is generally inflamed, or is the seat of one or of several abscesses. (See LIVER — *Inflammation of.*) When the attack is *slight*, and is attended by little pain, or by pain increasing slowly after pressure; and when there is little fever, the pulse being oppressed, rather than much accelerated; *local depletions* from the margins of the ribs, and from the anus, with the other means just advised (§ 65.), will generally remove all disorder. But when the bowels are costive, additional means will be required, especially *mercurials* with antimony; *saline medicines*, either alone, or with other *aperients;* a solution of sulphate of magnesia in camphor julep, with the solution of the acetate of ammonia, and spirits of nitric æther; the warm turpentine epithem applied over the epigastrium; the warm bath, &c.

67. In the more *acute cases*, particularly when there are much fever, intensely deep jaundice, very quick pulse, dry tongue, flushed countenance, and scanty, dark urine, the treatment should be most actively antiphlogistic. — General *bloodletting* ought to be early employed, and be followed by local depletion; by full doses of *calomel*, or of calomel with *James's powder*, camphor and opium; by *saline aperients;* by *antimonials* and saline *diaphoretics;* and by the rest of the means advised in the article on *Inflammation* and *Abscess* of this organ. In all such cases, the treatment should vary according to the history of the case, particularly in respect of previous disease of this viscus, and to the habits, age, and other circumstances of the patient. If the treatment be not active at the commencement, and in some instances where it has been both active and judicious, delirium and coma will supervene in four or five days, or even earlier, if vital power be exhausted, and if the discolouration be very deep. In this stage, treatment will seldom be of much avail. The propriety of then having recourse to depletion will entirely depend on the strength and frequency of the pulse, on the state of the hepatic regions, and on the means previously employed. In some, local depletions may still be resorted to; but, in all such, camphor with other mild restoratives will be appropriate. Calomel will seldom be of any use at this period, if it have been already liberally prescribed. If it have not been employed, it may be given with camphor. Some benefit may accrue from an occasional exhibition of a draught containing spirit of turpentine with, or without, castor oil; from the same substances administered in enemata, from the warm turpentine epithem applied over the epigastrium and hypochondria, and from a large blister on the nape. When jaundice is dependent upon abscess of the liver, the

treatment must be conducted as advised for this state of disease, in the article Liver.

68. iii. *Jaundice from Congestion of the Portal and Hepatic Veins* often requires very nearly the same treatment, as just recommended for the slighter states of the preceding variety (§ 66.). — *Local bloodletting* is generally sufficient; and, unless in cases where the congestion depends upon dilatation of the cavities of the heart, the application of leeches to the anus is preferable to cupping over the hypochondria. If the congestion is connected with a stoppage of the hæmorrhoidal flux, leeches are especially serviceable. When congestion is chiefly in the hepatic veins, the circulation through the heart and lungs is often interrupted, and the congestion soon extends to the portal system, to the mesenteric veins, and the digestive mucous surface; the early stage of jaundice being characterised by a bloated appearance of the face, sometimes with lividity of the lips, and a deficiency, merely, of the bile in the stools. In these cases, the treatment should be chiefly directed to the primary complaint, and be modified according to the evidence furnished of the cause of obstruction. (See Heart — *Organic Lesions of.*) — When *hæmorrhage* from the digestive or respiratory mucous surface occurs in this variety, as sometimes observed, *cupping* from the sternum, or leeches applied to the anus, will be of service. In many cases of this kind, the liver is more or less enlarged, owing to the prolonged congestion; and, although there can be but little expectation of a permanent restoration of this organ to its functions, whilst the obstruction to the circulation continues, deobstruent and saline *purgatives* will generally be useful, especially mercurials, the bitartrate of potash with the sub-borate of soda and confection of senna, the preparations of taraxacum with soda, and the hot turpentine epithem placed on the abdomen, &c. — *Dropsical effusion* sometimes takes place in the advanced course of this form of jaundice, and requires *diuretics*, in addition to the decided exhibition of the medicines just named. The internal and external use of the spirits of turpentine; the compound decoction of broom with the acetate of potash, or with carbonate of soda, and spirits of nitric æther; weak solutions of the hydriodate of potash, or the solution of potash; occasionally the more drastic or hydrogogue *purgatives;* and a course of deobstruent *mineral waters*, such as those of the Beulah Spa, of Cheltenham, Pullna, Seidschutz, &c.; will sometimes be of service.

69. iv. *Jaundice from Chronic Organic Lesions of the Liver* requires a treatment modified according to the history of the case, and the signs furnished by a careful examination of the hypochondria, and even of the lower regions of the thorax. If the patient have had attacks of acute or subacute hepatitis or dysentery, or is subject to chronic dysentery or diarrhœa, very probably the circulation through the extreme branches of the portal vein, and the passage of bile along the small ducts, are obstructed by a deposit of albuminous lymph from the inflamed vessels in the areolæ or reticulations of the connecting cellular tissue of the organ, and by the pressure on these vessels thereby occasioned. In cases of this kind, more or less enlargement of the liver may be detected, especially in those which are less chronic; although, in the more protracted, the liver may have regained its former size, or have become even smaller, its structure being dense, granulated, or otherwise changed. In these latter, the nutrition of the organ, as well as its functions, is impaired; and the deposits formed in the substance of the organ become organised, or partially identified with it, and perpetuate the obstruction. In this variety, particularly in the less prolonged instances of it, the *exciting causes* of the hepatic disorder should be avoided. — *Diet* and *regimen* will very much assist the treatment. Stimulating food and drink should be relinquished, and *deobstruents* and *alteratives* adopted. If any remains of inflammatory action still exist, *leeches* should be applied to the anus, or to the epigastrium. In any circumstances, Plummer's *pill* should be taken regularly at bedtime, either alone, or with a little *soap* and extract of *taraxacum* (F. 503. 511.), and the *bitartrate of potash*, with the *sub-borate of soda*, in any vehicle, or with other medicines, according to the state of the bowels (F. 89. 96. 98.).

70. If *evacuations of blood* from the bowels occur, the *hydrargyrum cum cretâ* with *ipecacuanha*, enemata containing *spirit of turpentine*, or an occasional draught with this substance and castor oil, or the *nitric* or *nitro-muriatic acids* in the simple infusion of roses, will be useful. In all cases, frequent *frictions* over the hypochondria and epigastrium with an oleaginous and deobstruent *liniment* (F. 297. 311.), or with this conjoined with the mercurial liniment, will be of essential benefit. This variety, like the preceding, is very apt to become complicated with *anasarca* or *ascites*, or with both. In this case, the decided use of *mercurials*, the more drastic and hydrogogue *purgatives*, the bitartrate of potash in large doses with borax, *diuretics*, and the other means noticed above, and advised for Dropsy, proceeding from disease of the liver, will be requisite. Assiduous frictions of the hypochondria and abdomen with *liniments*, particularly with these just mentioned, or with those containing the *iodide of potassium*, and a course of deobstruent and purgative *mineral waters* (§ 68.), will sometimes be of use.

71. v. *The more doubtful Source of Jaundice in Spasm of the Ducts* requires means which have a stricter reference to the remote causes, and to the symptoms peculiar to the case, than to the existence of spasm. A large proportion of the cases usually attributed to this state, most probably would have been found, upon a more accurate investigation, to belong either to congestion of the hepatic veins; or to calculi lodged in the ducts; or to obstruction of the mouth of the common duct, arising from the states of the duodenum; and they consequently would have required a similar treatment to these. The affection attributed to the ducts may have been almost entirely confined to the duodenum; the means found of service, as *calomel* alone, or with *opium*, saline or other *purgatives*, *anodynes*, *emetics*, &c., instead of acting upon the former, actually removing the disorder of the latter, or carrying off mucous sordes from its surface, or subduing vascular turgescence from around the opening of the common duct. — When there is any reason to suppose that the reputed spasm of the ducts is actually a paralysed state of the organic nervous influence of the liver and ducts, *restorative means* will then be required. The

chlorate of potash with carbonate of *soda*, gum *ammoniacum* with Castile soap, the nitric or *nitro-muriatic acids* given internally, or the nitro-muriatic acid lotion or bath, *frictions* with stimulating liniments on the hypochondria, the ammonical and mercurial *plaster* in this situation, and *blisters*, will be severally beneficial in cases of this kind, as well as in the immediately preceding variety, when the energies of life are much exhausted.

72. vi. *Jaundice from Obstruction of the Ducts* (§ 35.). — When the obstruction depends upon the *passage of calculi*, as evinced by the symptoms noticed above (§ 39.), and more fully described in the article, Concretions — Biliary (§ 6.), the means fully detailed in that article (§ 14.) should be resorted to, especially full doses of *opium*, alone or with antimony, of *belladonna*, or of other narcotics; the *warm bath*, warm *fomentations*, or the *turpentine epithem* on the abdomen, &c. No advantage, but rather mischief, results from the exhibition of mercurials in this state of the disease. When the obstruction arises from *compression, inflammation, and obliteration of the ducts* (§ 38.), in some part of their course, or even near their entrance into the duodenum, as from malignant tubera or other organic changes in the liver, or in the vicinity of the capsule of Glisson, and from the organic lesions of the duodenum and pancreas already noticed, Dr. Bright considers that the evacuation of fatty matter in the stools is not infrequent, especially if the biliary obstruction is permanent. In these cases, jaundice assumes a dirty or dark green hue, and is but little benefited by treatment; emaciation, exhaustion, hæmorrhage from mucous surfaces, or coma, supervening, and terminating existence. Palliative means, however, should be employed, especially *opiates*, the *solution of potash*, or of the *iodide of potassium*, with extract of *conium* or *hyoscyamus*. The constitutional powers should be supported by mild tonics and gentle nourishment, and irritation of the stomach allayed by opiates and salines given in aromatic vehicles, or by other appropriate remedies.

73. vii. *The other States and Associations of Jaundice* require the same principles and means of cure as have been stated, according to the peculiarities of individual cases. — *a*. This especially obtains in respect of *green or black jaundice*, the most appropriate means for which have been just noticed (§ 46.); and in regard of *the complications and successions of jaundice* (§ 49.), which usually present one or other of the pathological states already considered, particularly under the first, second, and third varieties.

74. *b*. For *cachetic* or *pseudo-jaundice* (§ 45.), the remedies mentioned in the articles Cachexy, Chlorosis, Cancer, Fungoid Disease, &c., may be resorted to, when these or any other malignant malady resembles jaundice, owing to contamination of the circulating fluids, or is associated with it. In such cases of contamination, as well as in the very acute and febrile form of jaundice, denominated *malignant* or *pernicious* (§ 58.), the alkaline carbonates with camphor, solutions of the chlorate of potash, or of chlorinated soda; and the other means advised for the hepatic complications of *Typhoid* and *Putro-adynamic* Fevers (§ 49.), will be most appropriate.

75. *c*. *Traumatic jaundice* (§ 52.) must be treated according to the symptoms evincing the existence of any of the pathological states and alterations above referred to (§ 26.), and conformably with the principles already stated.

76. *d*. *Infantile jaundice* (§ 53.) requires merely gentle aperients, especially the *hydrargyrum cum cretâ*, with dried *subcarbonate of soda* and *rhubarb*, with an occasional dose of *castor oil*.

77. viii. *Of various Remedies recommended by Authors for Jaundice.* — *A*. *Antiphlogistics* are advised by numerous writers in the treatment of jaundice. Stoll supposed that these means are more necessary in this complaint during winter or spring, than at the other seasons. — *a*. *General bloodletting* is directed by Hippocrates, De la Motte, and others. Zacutus Lusitanus also recommends it, but with the utmost caution. Dr. Bright very properly limits it to the more acute or inflammatory cases. I have attempted above (§ 66. 67.), to point out the circumstances and varieties, in which it, as well as *local depletion*, should be practised; and have mentioned the situations where this latter may preferably be employed. — *b*. *Emetics* are prescribed by Hippocrates, Cælius Aurelianus, Horstius, Lentin, Hoffmann, Brocklesby, Stoll, and Conradi. When diffused inflammation, or even congestion, of the liver is present, or when gall-stones are passing the ducts, they may be attended by some risk; but when inflammatory symptoms and pain are absent, and when the liver is not apparently enlarged or congested, they may be productive of benefit. — *c*. *Laxatives* and *purgatives* are much safer than emetics, and more generally appropriate. Hippocrates, Galen, Forestus, Ruland, &c., placed great dependence upon them. Much, however, depends upon the selection of them, appropriately to existing pathological states. Schneider prefers the combination of *senna* with *guaiacum*; Otto, *aloes* with *soap*; Lentin and Horn, *rhubarb* with *bitartrate of potash*; and the majority of recent writers in this country, *calomel* or *blue pill*, alone, or with other purgatives. I have found, after one or more doses of these last, that any of the former will be very serviceable, especially the bitartrate of potash in large doses, either with the sub-borate of soda (F. 790.), or with the confection of senna, or with this and guaiacum, according to the pathological states inferred to exist. Other purgatives will, nevertheless, be often equally beneficial; but, in the more inflammatory cases, the more cooling should be selected: and when a torpid state of the liver, or deficiency of vital action in it, is inferred, then the warmer, more stimulating, or stomachic aperients should be prescribed, and be aided by the other means advised for this state. — *d*. The *diet* should also be suited to the treatment; and where depletions and evacuations are required, it ought to be most spare, cooling, and chiefly mucilaginous, or consist of the mildest of the farinaceæ.

78. *B*. *Diaphoretics and sudorifics* are prescribed by Cælius Aurelianus, Riedlin, Stoll, Richter, &c.; and *antimonials* are the remedies belonging to this class, which are preferred by modern writers. When conjoined with other remedies, they are of much service; as with nitrate of potash, and the spirits of nitric æther, in the more inflammatory states, and with anodynes and opiates in some other circumstances. — The *warm bath*, the *vapour bath*, *fomentations*, and *warm poultices* may also be noticed under this

head, as being sometimes useful. A diaphoretic, as well as a deobstruent, effect is also produced by a combination of calomel with antimonials and opium, or of calomel, camphor, and opium; and is often of great benefit in the more imflammatory varieties, after general or local depletions.

79. *C. Deobstruents and alteratives* of various kinds are much insisted on by Lentin, Stoll, and most modern writers. Several of these, suitable to the more chronic cases of jaundice, are prescribed in the Appendix (F. 503. *et seq.*).—*a.* The deobstruent effects of *mercury* in this complaint are much confided in by Desault, Thomann, and most recent writers; but there is little agreement between them, as to the preparation which should be preferred, or as to the extent to which it should be pushed. Gibbon and others prefer *calomel*, and give it until it produces salivation. In the more chronic cases especially, I prefer Plummer's *pill* with *soap* and *taraxacum*, occasionally aided by *mercurial liniments*, or *plasters*, applied to the hypochondria. — *b.* Simple or medicated *soaps* are much praised by some authors, and particularly by Boyle, Stoerck, Ranoë and Quarin. They are often very useful, either alone, or with taraxacum, mild mercurials, oxgall, assafœtida, or with ammoniacum, or even with narcotics. The *alkaline subcarbonates*, and *solution of potash*, are also serviceable in similar combinations, and, as well as the soaps, are safe medicines in all states of the disease. — *c. Taraxacum*, in decoction or extract, has been much used in jaundice, since it was praised by Ranoë and Quarin; but it should be given in large doses, or be aided by other medicines, as the alkalies, soap, neutral salts, &c. I have given it with small doses of *colchicum*, and in other combinations. (F. 76, 77. 392.)—*d.* The *Solanum dulcamara* was recommended by Linnæus for jaundice, but it is rarely prescribed, although much used as an alterative in cutaneous eruptions depending upon, or connected with, biliary disorder. It may be advantageously given in decoction with taraxacum and the alkaline subcarbonates, or with the other alteratives already noticed (F. 59.), Plummer's pill being taken at night. — *e.* I am not aware that the preparations of *colchicum* have been recommended for this complaint by writers. I have, however, prescribed it in several cases with marked benefit, chiefly in conjunction with mild mercurials, or with soap, alkalies, &c., or with magnesia or neutral salts, according to circumstances. It should be given in small doses, be continued for a considerable time, and carefully watched. If there be much debility, or if it produce depression, it should be given with camphor, or the more tonic substances recommended for the complaint. It often increases the biliary secretion in the cases depending upon chronic inflammatory action, or enlargement of the liver; and promotes resolution of the former, and diminution of the latter, morbid state. —*f.* I have also given the preparations of *sarsaparilla* with advantage, in conjunction with the liquor potassæ.

80. *f.* The internal use of *nitric acid* was advised by Frank. It is likely to be useful in some of the more chronic states. The *nitro-muriatic acid* was praised by Scott, Annesley, and others. I have found it decidedly beneficial in some cases; but have, contrary to the usual mode, prescribed it internally as well as externally. It may be employed as a warm foot-bath, or as a lotion, applied warm or tepid, over the hypochondria and epigastrium. It is most serviceable in torpid states of the liver, and in the more chronic cases. It should not be employed when inflammatory action is present. — *g.* The *chlorate of potash*, or the *chlorinated soda*, will be sometimes useful in the circumstances or conditions of the disease in which these acids are indicated. The chlorate of potash may be advantageously conjoined with the carbonate of soda, or with other substances. — *h.* The preparations of *iodine* are sometimes also of service, in similar states of jaundice to those just alluded to, especially the *hydriodate* and the *iodides of mercury*. These may be given with *conium* or other narcotics, particularly where there is reason to infer the existence of chronic obstruction, or malignant disease of the liver, or of adjoining parts. — *i.* The *liquor potassæ* is also indicated in such cases, and in similar combinations.

81. *D. Diuretic deobstruents* are sometimes prescribed, but chiefly as adjuncts to aperients. They are noticed by Hippocrates and Riedlin. The *acetate of potash* (F. 841.) is the most useful of this class; but the *bitartrate* is equal to it as a diuretic, and even superior to it as a deobstruent in diseases of the liver, when given in large doses, so as to act upon the bowels, or when combined with the *sub-borate of soda* (F. 790.). Several of the foregoing medicines will be aided in their operation by emollient and mucilaginous diluents, as directed by Gilibert and others.

82. *E. Frictions* of the hypochondria and upper regions of the abdomen with stimulating and *deobstruent liniments* have received much less attention than they deserve. Indeed, they have hardly been noticed. When acute inflammatory action is not present, they will be found of much service. Several of those contained in the *Appendix* (F. 297. 311., &c.) may be prescribed either alone, or with *iodide of potassium*, or the *mercurial liniment*. Subsequently the ammoniacal and *mercurial plaster* may be kept applied to the side.

83. *F. Anodyne antispasmodics and narcotics* are directed by Vogler, Richter, Hufeland, Vogel, Brandis, and Conradi, chiefly on the supposition of jaundice being often a consequence of spasm; and ipecacuanha with opium is generally adopted by them. As this complaint often gradually disappears upon the cessation or removal of the remote cause which occasioned it, much of the benefit, that seems to follow these substances, probably depends upon this circumstance. When the disorder proceeds from the retention of a calculus in the ducts, they are probably useful in relaxing the parts, and thereby facilitating the excretion of it.— *Opiates* in full doses are prescribed by Wendelstatt, Vogler, Thomann, De Chave, &c.; and *belladonna*, by Greding. In the states just named, and when severe pain is present, the advantages derived from them are unquestionable, whether exhibited alone, or with calomel, or with alkaline subcarbonates, or with camphor and emollients.

84. *G.* Of *stimulating antispasmodics*, the *spirit of turpentine* is the most deserving of notice. It is recommended by Holst, Odier, and Durande. I have prescribed it with benefit in several varieties of the complaint, and in various modes, as already stated (§ 70.).— *Assafœtida* is mentioned by Herz: both it and *ammoniacum* are sometimes

of use in cases depending on torpid states of the liver, especially when conjoined with soap, alkalies, and other medicines already noticed. (See Form. 503—510. 891. 894.)—An infusion of the flowers of *arnica* was also prescribed by Plenciz and Stoll.

85. *H. Vegetable tonics and bitters* are directed by Riverius, conjoined with aperients; and are often of great service when thus exhibited, and when aided by the alkaline subcarbonates or neutral aperient salts.—The *absinthium* is recommended by Celsus, De Hayde, and Solenander; and *cinchona*, by Cammerarius, Fahner, and De Haen. This latter is prescribed with antimonials by Cornette; but it should be given with caution, as it is contra-indicated in the more inflammatory states of jaundice. I have had reason to believe it to have been even productive of the complaint, when exhibited freely in periodic fevers, before morbid secretions had been fully evacuated. The milder tonics and simple bitters are preferable to it in most cases, especially when they are prescribed as advised by Riverius, and when given during convalescence.

86. *I.* Of the *other means* advised by authors, there are few requiring particular notice. The watery extract of *Chelidonium*, and the extract of *Chicorium*, were recommended by Riverius, Lange, De Schullern, and others; the *Anagallis* with salines, bitters, and the ammonio-chloride of iron, by Stoll; the *Agrimonia*, by Hill; and the *Gramen caninus* and the *Berberis vulgaris* (F. 225.), by several writers. Inspissated *oxgall*, in as large doses as the stomach could bear, was prescribed by Stoll. *Blisters* on the hepatic region were directed by Bang; and *electricity*, by Hall and Darwin. The *mineral springs of Cheltenham*, of *Bath*, or of the *BeulahSpa*; the artificial mineral waters of *Seidschutz* and *Pullna*, or of *Ems*, *Eger*, and *Pyrmont*; are severally beneficial, when taken appropriately to the pathological states of the complaint. *Travelling* and *change of air* were much praised in jaundice by Celsus and Cælius Aurelianus, and in modern times by Gregory and others. Regular *exercise* on foot and on horseback is always of benefit, unless in cases depending upon inflammatory action.

87. The *Diet* and *Regimen* should be suited to the forms of the disease. — *Asses' milk* is advised by Hippocrates. *Common whey* and *goats' whey* are the best beverages that can be used during the attack. The drinks also prescribed under the head *Potus* in the *Appendix* (F. 588. *et seq.*), will generally be found useful. Upon the whole, the *diet* should be very nearly as advised in the article Concretions — Biliary (§ 18.).

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ICHTHYOSIS. — Syn. Derived from ιχθυς, gen. *υος*, a fish. *Albaras nigra*, Avicenna. *Impetigo excorticativa ; Lepra Ichthyosis*, Sauvages. *Ichthyosis*, Willan. *Lepidosis Ichthyosis*, Young. *Lepidosis Ichthyosis*, Good. *Ichthyose*, Fr. *Fischschuppenaussatz*, Germ. *Ictiosi*, Ital. *Fish Skin, Fish Skin Disease.*

Classif. — 6. *Class*, Diseases of the Excernent Function ; 3. *Order*, Affecting the External Surface (*Good*). 2. *Order*, Scaly Diseases ; 4. *Genus* (*Willan*). IV. Class, IV. Order (*Author*).

1. Defin. — *Morbid enlargement of the papillæ of the skin, and thickening of the lamellæ of the epidermis, either in parts, or over the general surface, presenting irregular compartments, and resembling in many cases the scales of fish.*

2. *Ichthyosis* is defined by Willan and Bateman, to be a papillary, indurated, and horny condition of the skin, to a greater or less extent. It has been placed by them among squamous diseases, but more recent writers have justly contended that it does not belong to this order. It consists of a morbid enlargement and elongation of the papillæ, and a thickening of the epidermis. Horny peduncles are thus formed, which spread so as to acquire broad irregular tops, and, undergoing partial exfoliation, sometimes resemble the scales of a fish.

3. This affection is *general* or *local*, and *hereditary* or *accidental*. When it is hereditary, it either is congenital, or it does not appear until some months after birth. The local form is most frequently accidental, the more general affection is commonly congenital or hereditary. The states of the complaint have been differently divided, and even described, by writers. The division and description of Dr. A. T. Thomson, are altogether incorrect, inasmuch as he confounds, as M. Rayer has shown, a disease of the cutaneous follicles with this affection, and mixes up a description of both, under the denomination of *Fortuitous Ichthyosis*.

4. I. Description. — i. *Hereditary Ichthyosis* is commonly general, affecting those places chiefly in which the skin is naturally thick and the epidermis rough, and being entirely wanting on the prepuce, eyelids, groins, axillæ, and on the palms of the hands and soles of the feet. When the disease is *congenital*, it is usually but little apparent; but the skin, instead of being soft and smooth, is sallow, dry, and shagreen-like. In the course of the two first months, the cuticle becomes, particularly in places, rough, thick, and of a greyish or sallow hue. It may remain in this state for years, or even during life, without proceeding further; but the alteration may increase until it is very remarkable.—Ichthyosis sometimes does not appear until several months after birth. It is then often developed more rapidly, until the epidermis is divided into small irregular compartments, resembling that covering the legs of fowls, or the scales of serpents, the "*Ichthyose nacrée serpentine*" of Alibert.

5. Hereditary ichthyosis is sometimes limited in extent, and is confined chiefly to the extremities. It is then still more remarkably developed, and assumes the appearance of a thick epidermic layer, or of the bark of certain trees. In these cases, as in the foregoing, the epidermis is composed of a number of small compartments of irregular shapes, which are not imbricated, are from two to three lines in diameter, but are often broad in proportion as they are thin. The morbid surface is generally greyish or sallow; sometimes of a brownish hue; but, in a few cases, it is shining or opalescent. It is so rough, that it feels like shagreen, or like the surface of a file, when the hand is passed over it, — "*Ichthyose nacrée cyprine*" of Alibert. — In these states of the complaint, the epidermis is chiefly altered; and the scales, excepting the largest, which adhere strongly, may be removed without causing much uneasiness. But, however detached, they are soon reproduced.

6. ii. *Papillary Ichthyosis*, or that in which there is chiefly a *remarkable elongation of the papillæ* of the skin, is a very rare variety. The first case of this kind, which was minutely described, was that of a native of Suffolk, who exhibited himself, in 1710, under the name of the *porcupine man*. More recently a family of the name of Lambert, affected with this variety, were described by Geoffroy St. Hillaire, and others. About 1830, I examined a very remarkable case, which was seen by many of the medical men of the metropolis. In all these instances, the complaint was confined to the males of a family. The brothers Lambert could trace it back through five generations, all of which were affected with it. The alteration of the skin appears to have been the same in all the cases, and identical with that which I examined. The *papillæ* were remarkably hypertrophied and elongated, over nearly the whole of the cutaneous surface, excepting the prepuce, axillæ, groins, eyelids, soles of the feet, and palms of the hands. Over the rest of the body, the elongated papillæ presented the form of short spines closely pressed together. They were whitish or greyish when separated, but blackish or brown on their exposed surface: and so hard and elastic, that they produced a noise when the hand was passed quickly over them. These productions have generally exuded a reddish brown serum, when divided close to their bases, and have soon been reproduced. They could not be removed without pain.

7. iii. *Accidental and Local Ichthyosis* is a very distinct form of the disease from the foregoing, and is generally produced by pressure. It sometimes occurs on the lower and anterior parts of the thighs of shoemakers; and in other parts, where pressure is made, in various employments. It thus resembles corns in its mode of production.

8. In *the several forms of ichthyosis*, the morbid

cuticle is generally thrown off in summer, or at other seasons, but it is soon after reproduced. RAYER states that the skin, divested of its squamæ, shows no appearance of inflammation; and that its colour is natural, only the shallow furrows on the surface are more remarkable than usual. The cutaneous perspiration and follicular secretion are suppressed. The complaint is not attended by pruritus, or by any other morbid sensation: the general health is unaffected by it. When it is general, copious perspirations take place from the soles of the feet, palms of the hands, and other parts above stated to be free from it. The pulmonary exhalation and urine are probably increased, in proportion to the diminution of the cutaneous exhalation. RAYER thinks, that persons affected with ichthyosis are liable to be attacked with acute inflammation of the skin, which throws off the morbid cuticle; but the original complaint is soon afterwards reproduced.

9. iv. *The Anatomical Changes* constituting ichthyosis have been described by TILESIUS, BUNIVA, and RAYER. The small compartments, into which the epidermic layer is divided, do not overlap each other like the scales of fish: hence the term ichthyosis is inappropriate. These layers, according to BUNIVA, consist chiefly of gelatine, hardened by phosphate and carbonate of lime. M. DELVAUX states, that they contain also traces of iron and of silica. They present the same chemical constituents as the hair, nails, &c. The lines or furrows of the surface of the corion are more distinct, and the papillary eminences more decided, in this complaint, than in the natural state. TILESIUS found the cutaneous follicles obstructed, and full of a thick substance, in *the papillary variety* (§ 6.); and in the *squamous varieties* examined by RAYER, these follicles were but little apparent, or imperceptible. Dr. MARTIN observed the hair and hair-bulbs remarkably enlarged; and the corion is usually thicker, harder, and denser than natural. Ichthyosis appears to be unconnected with any internal disease.

10. II. DIAGNOSIS.—This affection is improperly classed by WILLAN and BATEMAN with squamous diseases, for it is entirely independent of inflammatory action. True ichthyosis always commences in a few months after birth, if it have not already existed; for the local variety can hardly be considered as connected with it, otherwise than in external appearance, and in the absence of inflammation. — In *lepra*, *psoriasis*, and *pityriasis*, the formation of scales is constantly preceded by redness of the skin: *lichen* is attended by severe pruritus, and preceded by the eruption of papulæ; and the scaly condition of *chronic eczema* is quite distinct from local ichthyosis. Ichthyosis, on the contrary, is attended neither by heat nor by pruritus, and is perfectly free from every inflammatory symptom. The *horny* or *warty productions* on the skin, — the former of which has been classed by WILLAN and BATEMAN with this complaint, — are entirely different from it, not only as to the form of the morbid formation, but also as to the extent of surface affected; these productions being limited to one or more points of the cutaneous surface.

11. The *ichthyosis of the face*, noticed by Dr. BATEMAN and Dr. A. T. THOMSON, has been more correctly described by M. RAYER, who has shown it to consist of a *sebaceous deposit* from diseased follicles. I have met with one instance of this affection, extending over, and on both sides of, the nose. It is always associated with inflammatory action, in its developed state. The following is the description of it by RAYER: — "The part of the integument affected, becomes, at first, unctuous or oily: the secretion of the sebaceous follicles then increases; the fluid thrown out upon the surface acquires additional consistency, and finally forms a kind of *squamous crust or layer*, of greater or smaller extent. Soft at first, and adhering but slightly, it by and by acquires hardness, and then cannot be removed without very considerable pain. The skin under this sebaceous deposit is of a vivid red; the orifices of the follicles appear dilated, and sometimes distended with concrete sebaceous matter."

12. III. CAUSES.—M. RAYER considers general ichthyosis to be a not infrequent disease. He has seen upwards of forty cases of it. It is known to be transmitted through several generations, and only to the male offspring. The whole of the male children of the same father and mother, who were themselves free from it, have been affected with ichthyosis. This was the case with two brothers, one of whom was in the Hospital "*De la Charité*," in 1827. This disease is very seldom produced accidentally long after birth. Neither climate, nor temperature, nor mode of life, exercises any influence in causing it. Some have ascribed it to moral affections of the mother during pregnancy; but this is extremely problematical. That it may be congenital, without the parents having been affected by it, is shown by a fact stated by RAYER: — He was consulted respecting three little boys who had it congenitally. Both parents were quite healthy and well formed, and the mother had never experienced disquietude nor alarm during these three pregnancies. It is very rarely observed in females.

13. IV. PROGNOSIS.—Hereditary, or congenital ichthyosis, frequently disappears for a time in consequence of acute inflammation of the skin; but a person affected with it can hardly be considered as likely to be permanently cured of it. Accidental and local ichthyosis, however, often yields to treatment.

14. V. TREATMENT.—i. *Hereditary ichthyosis* of considerable extent has rarely been permanently cured. M. RAYER states, that he has not succeeded in a single case. Happily this alteration of the skin is unattended by internal disorder, and is thus, comparatively, of little consequence. Emollient applications long continued, gentle frictions, mucilaginous and soothing fomentations, tepid baths frequently repeated, or alternated with the watery vapour, or the alkaline warm bath, have been severally employed in clearing the skin from the scales covering it, or in preparing it for the application of other remedies. WILLAN and BATEMAN prescribed without benefit various plasters, stimulating lotions, and other topical applications. Mr. COULSON resorted to a wash containing corrosive sublimate, in a boy, who was under his care; and subsequently, a liniment consisting of half an ounce of the ointment of nitrate of mercury and an ounce of olive oil, which was applied twice in the day. The scales soon disappeared, but the brown colour of the skin still continued. WILLAN recommends tar and pitch for this complaint; and gave as much as half an ounce, or even an ounce, daily, for some months:

and Bateman adopted the same treatment, with advantage both to the local affection and to the general health. Dr. Elliotson, for one of two brothers affected with ichthyosis, prescribed a warm bath every day, and desired the patient to anoint himself, on coming out of it, with oil; gentle friction of the surface, with sweet oil being employed twice a day besides. *Pitch* was also given internally, and increased gradually until ten scruples were taken three times in the day. The patient was clothed in flannel; was advised never to wipe the surface of his body after having anointed himself; and was directed to wear the same flannel shirt, drawers, and stockings, so that his skin was kept impregnated with oil. In about six or seven weeks the disease disappeared, the skin being soft and supple. The pitch produced no effect on the organs of digestion; and it neither was mixed with, nor had altered the smell of, the evacuations. Dr. Elliotson refers to two instances of the disease having been cured by Dr. Willan, by the use of pitch taken to the extent of an ounce daily. In Dr. Elliotson's case, no benefit was derived from the warm bath, as it produced smarting of the surface after the removal of the thickened cuticle; but the use of the oil probably accelerated the cure. The arsenical solution has also been tried, but with either very little or no benefit.

15. ii. For *local or accidental ichthyosis*, flying blisters, or topical stimulants, have been directed. Gentle frictions with a flannel cloth after coming out of a simple or sulphureous tepid water bath, and the sulphureous fumigating baths, aided by active exercise, have been found most serviceable in this form of the complaint. Mr. Plumbe succeeded in two cases, in removing this alteration of the skin, which was limited to the legs, by strapping the parts tightly with adhesive plaster, and applying a roller kept constantly moist with cold water. The straps were removed every fourth or fifth day. On the whole, this affection has been found to be very little under the control of medicine; and, notwithstanding the most active treatment has been adopted, the disorder has been known to continue for several years, with occasional variations.

16. iii. The *affection of the sebaceous follicles* of the face, mistaken by Dr. A. T. Thomson for ichthyosis, was successfully treated, by the decoction of the dock root, or the *Rumex obtusifolius*. It is prepared from one ounce of the sliced recent root, boiled in two pints of water down to one pint. The dose is a wine glass full three times in the day. It may be taken alone, or with the arsenical solution; if it should purge too briskly, a few drops of the tincture of opium may be added to each dose.

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ILEUS. — *See Colic.*

IMPETIGINOUS AFFECTIONS. — Syn. *Impetigo* (from *impeto*, I attack or infest), Celsus, Pliny. Λειχην αλφος, Galen. *Lepra Squamosa*, Auct. var.; *Herpes*, *Phlyctæna*, *Lichen*, &c., Auct. *Phlysis Impetigo*, Young. *Ecpyesis Impetigo*, Good. *Dartre*, *Dartre crouteuse*, Fr. *Zittermal*, *Ringwarm*, Germ. *Impetigine*, Ital. *Tetter*, *Humid or Running Tetter.*

Classif. — 3. *Class*; 3. *Order* (*Cullen*). 6. *Class*; 3. *Order* (*Good*). 5. *Order*, Pustular Eruptions (*Willan*). III. Class, I. Order (*Author*).

1. Defin. — *An eruption of one or more crops of small, yellow, itching pustules, disseminated or collected in clusters, the contents of which dry up in a short time, and assume the form of yellowish, rough, or prominent incrustations; generally unaccompanied by fever, and not contagious.*

2. I. Description. — Impetigo may attack every part of the body. It may be simple or complicated. Willan, Bateman, and Biett enumerate five species of the disease. I agree, however, with Dr. A. T. Thomson, in limiting them to two; three of those proposed by Willan being merely varieties of simple impetigo. The first species, or simple impetigo, according to this view, is unattended with fever, and comprises the figured, scattered, and scabid varieties. The second, or complicated, or erysepelatous species is attended with fever, owing, probably, to the extension of the inflammatory action to the more deeply seated integumental tissues.

3. i. *Simple Impetigo* — *Impetigo simplex* — usually occurs without any premonitory symptoms or derangement of health. It is met with most frequently in children at the period of dentition, in young persons of either sex, and in those of a sanguineous and lymphatic temperament, with a fine susceptible skin and florid complexion. It most commonly appears in the spring, at which season several have been periodically attacked by it during many successive years. This species occurs principally under two varieties. The pustules may be collected in circular or oval groups, occupying a surface of greater or less extent, but pretty exactly circumscribed: this variety constitutes the *Impetigo figurata* of Willan. Or the pustules may be scattered far apart, assuming no particular form, but disseminated over a surface of variable extent: this variety has been called *Impetigo sparsa*. To these a third division has been added, by the name of *Impetigo scabida*, but this is merely a more severe form of *impetigo sparsa*. Many intermediate degrees exist between these varieties; but the characters they present are

sufficiently distinct to give scope to the general study of the disease. At the same time each variety may be acute or chronic, according as it consists of a single crop, or of successive eruptions, of pustules.

4. *A. Impetigo figurata — Dartre crustacée flavescente* of M. ALIBERT — is the most common of these affections. It may occur in any part of the body, — on the neck, trunk, and extremities, particularly the hands; but it generally occupies the face, appearing most frequently on the middle of the cheeks, from whence it extends, in a circular or oval direction, over a considerable extent of surface. Sometimes it is confined to the eyelids, when it is commonly complicated with ophthalmia; and occasionally it appears on the chin, the ala nasi, and immediately below the margin of the septum of the nose. Although this variety usually occurs without very manifest disease of the general system, yet it not unfrequently follows anxiety or other depressing affections of the mind. In this case it is ushered in by a feeling of lassitude, by disorder of the digestive functions, by weakness and uneasiness, accompanied by pain in the epigastric region, and sometimes by cephalalgia. The eruption, as it first appears on the face, commences by one or more small, red, and very superficial blotches, which itch considerably, and gradually enlarge, becoming covered with small, yellowish, psydracious pustules, placed so close to each other as to be almost confluent, and surrounded by a red inflamed border. The pustules are but slightly elevated, and are the seat and source of much heat and stinging pain. These clusters, which are usually of a circular or oval form, and of various dimensions, may continue isolated, or extend still further by the development of fresh pustules at their circumference; and the eruption may be so extensive, that both cheeks, and even the whole chin, may be covered with it at once. The pustules, however, do not remain long in this state; but in the course of thirty-six or forty-eight hours, or at most three days, they burst, and discharge an ichorous fluid, which dries quickly and is converted into a yellowish crust of greater or less thickness, very friable, slightly furrowed, semitransparent, and resembling portions of candied honey, or the concrete gummy exudations on a cherry-tree. At the same time the discharge continues under these crusts, thereby increasing their thickness, and causing them to extend considerably beyond the limits of the original pustules; and it is usually at this stage of the disease that the patient is seen by the practitioner. The skin in the circumference of these incrustations is of a red colour; and if the scabs fall or are rubbed off, the integuments under them appear likewise red and excoriated, exhibiting at the same time minute pores, from which a purulent discharge exudes, which greatly augments the heat and smarting. Towards the edges of these diseased patches may be still seen some unbroken psydracious pustules, and others over which the liquid has flowed when it is scarcely coagulated. If the disease be of great extent, the features can hardly be recognised.

5. *Impetigo figurata* continues in its crustaceous state from two to four weeks, when it is not protracted by successive eruptions: the itching and heat then abate, as well as the morbid secretion; the incrustations become drier, and fall off irregularly, leaving one or more red spots or marks, which remain visible for more than a month. The cuticle at the same time is so thin, as to be liable to excoriation from the slightest friction, and a very trifling exciting cause often brings back the disease. More frequently, however, the ichorous discharge is reproduced, accompanied with fresh crops of psydracious pustules; the eruption is repeatedly renewed after running its usual course, and thus continues for many months, sometimes for years. In this manner it becomes a chronic disease, although the successive inflammations keep it always in an active state. In these cases the inflammation does not spread superficially, but penetrates the whole thickness of the skin, and sometimes affects the subcutaneous cellular tissue. When the disease yields either spontaneously, or to medical treatment, the amendment commences in the centre of the patches; and even when this occurs, not infrequently the edges retain their diseased character, and fresh pustules are produced: these, however, as the treatment proves successful, also gradually disappear; and the skin regains its natural colour slowly in these parts.

6. *Impetigo figurata* may appear on the limbs; and even on the body. When it affects the lower extremities, the patches are usually large, and of an irregular oval, whereas they are smaller and rounder on the upper limbs. Sometimes the patches enlarge by successive marginal crops: this has been observed on the legs, which have thus been gradually covered from above the knee to the ankle. The disease often becomes chronic, and the time of its duration varies. In such cases, we do not observe successive and abundant crops of pustules, or these large inflamed patches, but merely a few occasionally. Frequently, however, no pustules are found; but the peculiar form of the patches and crusts, with the partial eruption from time to time, suffice to characterise it. In some instances the pustules are intermixed with transparent vesicles, as in some of the varieties of *herpes*. When this intermixture occurs, the disease is much more troublesome from the extreme irritation, itching, smarting, and heat, which accompany it, and is much more difficult of cure. When these vesicles break, they discharge a fluid much more acrimonious than that of the pustules, which, wherever it touches the sound skin, produces a vesicular inflammation and a pustular eruption. This variety of the affection appears principally on the hand, about the metacarpal bones, or on the wrist. The vesicles appear in slow succession at a little distance from each other and from the pustules; when broken, they are little disposed to heal; and the cuticle ultimately becomes thickened and inflamed, and covered with the rising eruptions, small humid ulcers, and chaps or fissures. The sensation of burning and intense itching is extremely distressing, especially on the first rising of the vesicles; and every remedial application, which is employed, becomes a source of irritation, and increases the evil.

7. *B. Impetigo sparsa* differs from the preceding variety merely in the irregular and scattered distribution of the eruption. Its nature and progress are the same; but, instead of being arranged in circumscribed groups, its pustules are dispersed without any regular order over the extremities,

neck, face, shoulders, and external ears. This variety is most prevalent in autumn, continuing obstinately throughout the winter, and disappearing only at the approach of summer. It has a greater tendency to pass into the chronic state than the last variety. Although it may develop itself on any part of the body, yet it affects more particularly the extremities, manifesting an especial predilection for the legs, and in that situation becoming extremely troublesome and obstinate. Sometimes it confines itself to one spot alone; at others, it covers a whole limb, or even more than one at the same time.

8. The pustules in *impetigo sparsa* are developed in the same manner as in *impetigo figurata;* but here, instead of being collected together, they are scattered irregularly over the diseased surface, and accompanied with insupportable itching. The incrustations also, which follow the bursting of the pustules, are thicker and more friable, and not formed into so large plates as in *impetigo figurata:* the attendant inflammation is, however, more extensive; and as they fall off and disappear, the surface of the limb becomes studded with ulcerations and fissures. Œdema is not an infrequent attendant or consequence of this variety of the disease.

9. In some cases, and especially in persons of advanced age, with enfeebled constitutions, the crusts attain a great thickness: they are of a yellowish brown colour, variously divided by deep fissures. They have been compared to the bark of a tree by Willan, who calls this variety *Impetigo scabida.* It is, however, nothing more than a severer form of the last variety. Sometimes these crusts cover a whole limb, till it is cased with them, the motion of it becoming both difficult and painful; at the same time considerable heat and a tormenting itching exist. After a while, these crusts split; and, when a portion of them is detached, a copious discharge exudes from the excoriated surface, quickly concretes, and fills up the vacuity. When this variety affects the lower extremities, and is very severe, it sometimes occasions œdematous infiltration and ulceration, and even extends to the toes and secreting matrices of the nails — *Onychia Impetiginodes.* The œdema and ulceration commonly appear about the ankles, particularly in aged, weakly, or broken-down constitutions. The ulcers are uneven; and either discharge a sero-purulent fluid, or are covered by yellowish crusts; their edges being irregular, purplish, or livid, and often crowned with small sanguineolent pustules. When this variety occurs in the upper extremities, it does not differ from that already described, but it is much less severe, and its chronic form more rarely associated with œdema and ulceration, than that observed in the lower extremities. Acute *impetigo sparsa* of the face usually presents greenish yellow incrustations, dispersed over the cheeks or adhering to the beard in the adult. In children, the inflammation often extends to the nose, which swells, and is sometimes plugged up; the disease then frequently becoming chronic.

10. *C. Impetigo Favosa.* —This variety is merely impetigo sparsa affecting the *neck, ears,* and *hairy scalp* — the *Porrigo favosa* of Willan, and *Tinea granulata* of Alibert — especially of children, and occasionally of adults. It occurs most frequently in the back parts of the head, but the entire scalp may be implicated; and it appears as yellowish white pustules, irregularly scattered over the hairy scalp, and attended by inflammation and pruritus, their centres being traversed by hairs. In from two to four days, the pustules pour out a fluid, which agglutinates the hair, and dries into small brownish or greyish, rough, and irregular crusts or masses like candied sugar. These become friable and detached from the surface, but adhere to the hair, which often seems filled with them; a faint, sickly, or unpleasant smell being exhaled from the head, when cleanliness is neglected. *Pediculi* multiply rapidly, and swarm in the hair, which is not lost, but is often agglutinated or matted by the discharge.—Impetigo of the hairy scalp is not contagious, and does not implicate the piliferous bulbs, like *favus* or true *porrigo.* It seldom lasts longer than some months; and it commonly is removed in the course of a few weeks, with proper treatment. When it becomes chronic, the inflammation often extends to the cellular tissue underneath, giving rise to small circumscribed abscesses. The lymphatic glands of the neck are frequently enlarged and painful.—Rayer and Green consider that this affection of the scalp is strictly a form of *Impetigo sparsa,* and not a variety of the disease, to which Willan has applied the term *Porrigo;* and I am of the same opinion.

11. ii. *Complicated Impetigo.* — *A. Impetigo Eczematosa.* — Impetigo is sometimes associated with *Eczema—Eczema Impetiginodes.* (See art. Eczema, § 5.) The eruption so frequent in infants during suckling and teething, commonly called *Crusta Lactea,* or *Milk Scall,* is evidently an association of this kind, chiefly affecting the face, and extending partially to the scalp; the characters of eczema predominating in some infants, and those of impetigo in others. Occasionally it assumes nearly the appearance of impetigo figurata. It has been variously arranged by writers on diseases of the skin, who have, even to the present day, been more desirous to point out, and even to feign, distinctions, than to trace the changes which these diseases undergo, and the connections which subsist between them, or to show how frequently the one runs into the other; and has been termed *Impetigo larvalis, Impetigo mucosa, Tinea lactea* (Sauvages), *Tinea benigna, Tinea muciflua* (Alibert), *Porrigo lactea, Porrigo larvalis* (Willan, Bateman), *Lactumen, Eczema lactea,* &c., according as it was supposed to be allied to *Impetigo, Porrigo,* or *Eczema.* This of itself is sufficient to show the very intimate relation of these affections to each other, and to point out the necessity of considering them in their natural conditions, and in connection with their particular seats, and with the states of vital action; and not merely with reference to certain artificial distinctions, which often cannot be ascertained, and which sometimes do not exist. The differences between *vesicles* and *pustules,* so much insisted on in the classifications usually adopted at the present time, often do not exist, or exist not in such a manner as to become available to the practitioner. These, and numerous others, so implicitly received as matters of belief, may be useful, as a part of the craft of the adept; but they are of very minor importance in the estimation of the truly philosophic observer, and are valued by him for just as much as they may be worth, in the particular cases in which

they are manifest. An eruption may be vesicular to-day, and pustular to-morrow; or, in other words, the former, owing to changes in the vital actions of the part affected, and in the morbid secretion, may pass into the latter; or both kinds of eruption may be coexistent or coëtaneous, either in the same, or in different, situations of the same case. Instances will also occur, in which the most acute observers will be puzzled to determine whether the primary eruption is vesicular or pustular; for it may be intermediate as respects the appearances both of the contained fluid, and of the containing and surrounding tissues. To whatever genus this eruption may be referred, — whether it be dignified in being described as a genus of itself, or be viewed as merely a species, or be debased to the rank merely of a mongrel variety, — it is consolatory to know, that, in its intenser states and more extended forms, as well as in slighter grades, and however great the attendant pruritus and pain may be, or however deep the chaps or fissures may seem, no permanent marks or cicatrices are produced by them.

12. *B. Impetigo Erysipelatodes* is easily distinguished, by presenting, at its commencement, the ordinary symptoms of erysipelas. The other varieties of the eruption are in general unattended by any febrile disturbance, although the digestive organs may be more or less disordered. But this is ushered in by decided symptoms of constitutional commotion. Its premonitory stage is characterised by perturbation of the system, fever, much burning and smarting heat, an œdematous state of the eyelids, and a redness and puffy swelling on the upper part of the face. This state of things continues for two or three days; when, on running the finger over it, the surface, instead of the smoothness of erysipelas, is found to exhibit a slight inequality; and on minute examination it seems papular. In a day or two more it is covered with numerous psydracious pustules, which first appear below the eyes, but soon cover the greater part of the face, and sometimes extend to the neck and breast. The itching, smarting, and sense of heat, which accompany these pustules, are very distressing. When they break, a hot acrid fluid exudes, which irritates, and often excoriates, the sound surface on which it flows. The face remains in this painful condition for ten or fourteen days, when the discharge diminishes, and concretes into thin yellowish scabs, in the interstices between which, fresh pustules arise at intervals with renewed heat and pain, and run the same course as the former. The disease may continue thus severe and troublesome for two or three months. The period of its duration, however, is uncertain; and when it disappears, it leaves the cuticle in the same dry, red, and brittle state, which characterises the departure of the other varieties of impetigo. During the progress of this disease, the health of the patient is not very much disordered, and the constitutional disturbance is much less than in erysipelas. This form of the disease is occasionally confounded with *eczema impetiginodes*. In the advanced stage, however, the distinction is easily recognised.

13. Besides the above varieties of *impetigo*, Willan and Bateman mention another, under the title of *Impetigo rodens*. It is, however, of very rare occurrence, and cannot with propriety be called an impetiginous disease, being more of a malignant ulcer, complicated with psydracia. It is said to be uniformly fatal, and to have been benefited by no remedies, either external or internal, which have been employed for its relief.

14. II. Diagnosis. — The varieties of impetigo are liable to be confounded with other pustular eruptions, especially *porrigo*, *ecthyma*, and *scabies*, and with *eczema*; but a careful inspection of the pustules and of the incrustations, as either may present themselves, will show the differences between them. — *a*. The clusters of *impetigo* are distinguished from the circles of *porrigo*, in not continuing to pour forth a purulent and glutinous discharge, but, after the first eruption, an ichorous humour; and in not forming those thick soft and copious scabs, which characterise the latter disease. The pustules of impetigo discharge, while those of porrigo, seated more deeply, are quickly changed into dry, yellowish-coloured, cup-shaped scabs. The crusts of the former are brown, or of a dull grey, and not broad, thick, nor continuous, as in *porrigo scutulata*. Impetigo of the hairy scalp is not likely to be mistaken for *porrigo lupinosa*: it does not implicate the piliferous bulbs, like this and the other varieties of porrigo. It is distinguished, however, with greater difficulty from *eczema impetiginodes* affecting this part, the principal difference being in the appearance of the incrustations; but, as already insisted on, these latter are very nearly related eruptions. — *b*. The diagnosis between *impetigo* and *scabies* depends on the distribution of the eruption in patches; the copious exudation of ichor; and the reddened, rough, and fissured cuticle; and the heat and smarting, which accompany the itching, in the former. In the strictly purulent scabies, the pustules rise to a much greater elevation and magnitude, than in this complaint, and are filled with a thick, yellow pus, and are more inflamed around their base. Porrigo and scabies are contagious; but none of the varieties of impetigo possesses this property. — *c*. In its more advanced stage, impetigo may be mistaken for *psoriasis* or *lepra*; but, in these, there are no laminated concretions of ichorous matter or lymph, the squamæ consisting of exfoliations of morbid cuticle. These scaly diseases emit no fluid; and the existence of pustules and of a discharge, however slight, are sufficient to determine the impetiginous eruption. — *d*. The pustules of *psycosis* are larger, and not so yellow, and are more isolated and more prominent, than those of impetigo; which are always much crowded, and secrete abundantly. The scabs of the former are drier and of a deeper colour than the crusts of the latter; and are reproduced only after a fresh eruption of pustules. The crusts in impetigo are greenish yellow, thick, semitransparent, and reproduced without any renewal of the pustules. In psycosis, also, the pustules do not break till the fifth, sixth, or seventh day; whilst in impetigo they burst on the third or fourth. Moreover, tubercles and indurations are observed in the former, but not in the latter. — *e*. Impetigo is more likely to be confounded with *syphilitic eruptions* on the face; but the peculiar character of venereal desquamations, or the firmly adherent scabs, concealing ulcers and leaving indelible cicatrices, sufficiently distinguish the latter from the former. Some of the forms of eczema may be mistaken for impetigo, but the diagnosis has been fully stated in the article Eczema (§ 13.). The

most superficial observation will detect the very marked difference between *acne rosacea* and this complaint. Mr. Dendy states that the internal use of the deuto-ioduret of mercury often produces vesicles, followed by yellow or yellowish green scaly crusts, which may be easily mistaken for those of impetigo and porrigo.

15. III. Prognosis.—This is more favourable in impetigo than in *lichen*, *lepra*, *psoriasis*, *eczema*, and many other cutaneous eruptions. In whatever part of the body the disease, in its *acute state*, be situated, it generally yields to medicine in two or three weeks. Its duration in the *chronic form* cannot be stated with precision; as this necessarily depends on the constitution of the individual, the number of the eruptions, and the existence of other particular conditions, such as scrofula, pregnancy, amenorrhœa, the change of life, &c. When chronic impetigo occurs on the head, on the upper lip, or any other region covered with hair, it often proves a very obstinate and troublesome disorder; especially if the patient be of advanced age, of a scrofulous diathesis, or a shattered constitution. But, under no circumstances, can it be regarded as attended by danger. The sudden suppression of the more severe forms of the eruption, particularly those affecting the face and scalp of children, may, however, be productive of most serious disease.

16. IV. Causes. — Impetigo is not communicated by infection. It is most frequently observed among the poor, ill-lodged, badly fed, and filthily disposed classes. Its exciting causes are, however, sometimes obscure. Individuals of a sanguineous or sanguineo-melancholic or lymphatic temperament, and scrofulous constitution, with a thin, soft skin, are most liable to it. In them it is occasionally excited by violent exercise, by intemperance of any kind, or by the depressing passions of the mind, as grief, disappointment, fear, &c. It is very often preceded by headach, languor, and disorder of the alimentary canal, and cannot be traced to any other exciting cause than this disorder. — Infants at the breast, and children during teething, particularly the lymphatic and scrofulous, are most liable to the varieties affecting the face and scalp. Young persons with fine skins are sometimes attacked with that of the face, on exposure to a hot sun. Females, on the apppearance, and on the cessation, of the catamenia, are also apt to be affected with this complaint. Several external causes may, however, excite pustules of impetigo, by acting directly on the skin. Persons who handle irritating substances, as raw sugar, lime, or metallic dust, often have impetiginous eruptions on the hands. Bateman regards the pustules, caused by the ointment of tartarised antimony, as a species of this disease; but they are of an entirely different character, and cannot be classed among any of its varieties. I believe, that disorder of the digestive organs, and accumulations of mucous sordes and other secretions in the *prima via*, more commonly occasion impetigo than is generally supposed. I scarcely have seen a case, in which this derangement was not manifest either before, or in the course of, treatment; and in which this eruption was not evidently symptomatic of it. In this opinion I am supported by Mr. Dendy, my late colleague at the Infirmary for Children, where cases of this kind came frequently before us.

17. V. Treatment. — i. Whatever be the variety of simple impetigo, one mode of treatment is indicated. In the commencement of the disease, Willan and Bateman recommend the internal administration of *sulphur*, but not in sufficient quantity to produce purging; and if there is much inflammatory irritation of the cuticle, *soda*, *nitre*, or the *bitartrate* of *potash*, with which some of the *vegetable acids*, as *citric acid*, or *lime juice*, may be advantageously combined. The indiscriminate employment of sulphur has, however, sometimes aggravated the symptoms, and favoured the re-appearance of the eruption. I have prescribed, with marked benefit, the *sub-borate of soda* in emollient vehicles, either with or without small doses of nitre, or of the bitartrate of potash. — *Bloodlettings*, either general or local, have been proposed in extensive attacks of *impetigo figurata*, and in plethoric individuals may be of advantage; but, in general, they are not productive of benefit, and in persons of a weak and scrofulous habit of body are detrimental. If the eruption is attended by much fever, *calomel* and *antimonials*, or other mild mercurials, cooling *saline solutions*, and *diaphoretics* with *diuretics*, will be of service.

18. Locally, emollient fomentations, such as the decoction of mallows, digitalis, poppy heads, &c., and ablution with tepid water, are of the most essential service in the incipient stage of this disease, especially of the common saline mixture, with conium, be given at the same time. At a later period, saturnine or alkaline lotions, and the application of the ointment of the *acetate of lead* or *oxide of zinc*, will accelerate the cure, and will be often sufficient to effect it.

19. ii. When this affection occurs in children at the period of dentition, simple cleanliness is frequently all that is required. Here the eruption is occasionally accompanied by a manifest improvement in the constitution, and it would be highly imprudent, and even injurious, to check or repel it. If it occurs on the hairy scalp or face (§ 10.), the hair must be removed, and emollient applications resorted to. Where there is much local inflammation, or in plethoric children, *leeches* ought to be applied behind the ears. *Saline purgatives*, as the sulphate of soda, sulphate of magnesia, or tartrate of potash and soda, may be given with advantage in these cases, in doses of from two drachms to half an ounce daily.— If the disease, wherever occurring, proves obstinate, it has been usually treated by an alterative mercurial course, particularly *Plummer's pill*, or the *hydrargyrum cum cretâ*, with the decoction of *sarsaparilla* or *cinchona*; but a more beneficial effect has been derived from the exhibition of fine or six grains of *calomel* at bedtime, followed by a brisk *cathartic* the next morning, and a moderate dose of the *liquor arsenicalis*, taken three times a day, in the decoction of *elm bark*.

20. iii. As to *local means*, almost every variety has been tried in this disease. In some instances the patient cannot bear the most soothing and emollient applications; while, in others, the most stimulant have been employed with advantage. Where the irritation is insupportable, the use of the *hydrocyanic acid* has been suggested by Dr. A. T. Thomson, in the proportion of one fluid-drachm to four fluid-ounces of water, combined with one drachm of *alcohol*, and six or eight grains of *acetate of lead*; and subsequent expe-

rience has shown the value of this application. It sooths the irritation, and disposes the skin to regain its healthy action: but it must not be applied without caution; as cases have been recorded, where it became absorbed into the system, and produced depressing effects on the constitution, with considerable intermission of the pulse. These unpleasant symptoms, however, ceased on discontinuing it. It is useless to apply any local remedies, until the thick incrustations, which occur in *impetigo scabida*, are removed by emollient poultices, or by a weak decoction of poppies, or by exposing the surfaces to the vapour of hot water, &c. Any of the mild ointments before mentioned may afterwards be applied, and the surface should be covered with pledgets of soft lint, or the whole should be touched with a solution of *nitrate of silver*; or, if the skin is not very irritable, and the attendant inflammation but slight, while at the same time the disease has become chronic, the baths of Harrowgate, or artifical *fumigations of sulphur*, the hot air and *vapour baths*, and the *alkaline* and *sulphureo-gelatinous baths* will frequently both procure the removal, and prevent the recurrence, of the eruption. But in the more inflammatory cases, and in plethoric persons, bloodletting should precede a course of these baths. With the same intention, the baths of Barèges, Loüesche, Cauterets, Enghien, and many other Continental springs, have been recommended. Great benefit has also been derived from the warm sea-water bath, especially when followed by a course of sea bathing; it should, however, be remembered that salt water is injurious during any actual inflammation. But great discrimination is always required in the treatment of this eruption. Where there are much inflammation and irritability of surface, the internal remedies should be of a cooling and sedative nature; and the external applications, emollient and palliative; — in an opposite state, the *arsenical solution* may be given; and slightly stimulant ointments, such as the ointment of nitrate of mercury diluted with six or seven parts of simple ointment, or an ointment of trisnitrate of bismuth, may be applied. — In all cases, the *diet* of the patient should be restricted, and animal food taken in very moderate quantity: milk and farinaceous food are the most appropriate. Fermented liquors, spirits, and wine, ought to be strictly forbidden.

21. iv. In *impetigo erysipelatodes*, antiphlogistic means must be early adopted. *Purgative medicines*, especially the infusion of senna with full doses of the alkaline carbonates, and the *neutral salts* with *antimonials* and *nitre*, will materially alleviate the fever; but when the discharge is copious, and incrustations begin to be formed, the greatest benefit will be derived from the *decoction of cinchona* with *hydrochloric*, or dilute *sulphuric acid*.— If the disease becomes chronic, a slight alterative course of *mercury* and of *sarsaparilla* generally proves beneficial. The *solution of potash* and the *alkaline carbonates* are also serviceable, when taken in tonic infusions. The *local remedies*, which were recommended in the other forms of the disease, namely, emollient fomentations and tepid ablutions, mild ointments applied to the excoriated surfaces, and sea bathing, or sulphureous fumigation on the decline of the eruption, will also be required in this variety.

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IMPOTENCE AND STERILITY. — Syn. *Impotentia Generandi, Sterilitas*; ʼΑναφροδισια, *Anaphrodisia* (from α, neg., and ἀφροδισια, and that from ʼΑφροδιτη, Venus), Auct. var. *Impuissance*, Fr. *Unvermögen zum Beyschlaf*, *Ohnmächtigheit*, Germ. *Impotenza*, Ital.

Classif. — 4. *Class*; 1. *Order* (*Cullen*). 5. *Class*; 2. *Order* (*Good*). I. Class, II. Order (*Author*).

1. Defin. — *Incapacity of sexual intercourse, and inability of procreation.*

2. *Impotence* and *Sterility* are so intimately related, that they must necessarily be considered under one head, although disjoined by Good and some other nosologists. They are subjects of much greater practical importance than has been conceived by many, and often involve the happiness and perpetuation of families. Yet have they, by a sort of professional prudery, been either entirely overlooked by medical writers, or very imperfectly discussed, and thereby relinquished to the irregular practitioner, or to the entirely unqualified empiric. In the present æra of high refinement, and of luxurious, if not vicious, enjoyments; and under the influence of noxious plans and systems of education; instances are very numerous, for which medical advice is required for the removal of the morbidly disqualifying conditions about to be considered, but is not resorted to so frequently as it ought to be. Since advice is thus often necessary, the ability of those, from whom the community have a right to expect it of the most judicious kind, should be equally great in providing it. There is every reason, also, to believe, that it would be oftener sought after, if the subject were known to be more fully entertained by the duly qualified members of the profession. The practical consideration only of these morbid conditions falls within my plan: their legal relations are very ably discussed in the classical works of Paris, Beck, and Smith.

3. *Impotence* may exist in either sex, but most commonly in the male, owing to the sexual conformation. *Sterility* most frequently depends upon the female, although it sometimes is owing to the male; and, in a practical point of view, if not in a medico-legal one, it is more frequently thus owing, than is stated in books.

4. *Impotence* and *Sterility*, in respect of both sexes, have been differently arranged by writers; — into *absolute* and *relative*; *constitutional* and *local*; *direct* and *indirect*; *permanent* and *temporary*; and, by Dr. Beck, into *absolute, curable*, and *accidental*. These distinctions are all of importance in the consideration of the subject; but the divisions founded on the nature of the causes are more useful. — M. Raige Delorme has ar-

ranged impotence into — 1. that depending upon lesions of the sexual organs; — 2. that proceeding from disorder or interruption of seminal emission; — and, 3. that caused by defect of the faculty of erection. The division adopted by Dr. Beatty, into — 1. Organic; — 2. Functional; — and, 3. Moral; — although not materially different from the foregoing, is preferable to it. — I shall consider the subject with reference — *first*, to the male, and, *secondly*, to the female; and view in succession the *mental*, the *functional*, and the *organic* states, from which impotence and sterility most frequently proceed.

5. I. Impotence in the Male — *Agonia, Agenesia, Impotentia Generandi Masculina, Sterilitas Paterna, Dyspermatismus, Dyspermasia*, Auct. var. — *Male Sterility* — may depend upon — 1. Mental influences or causes; — 2. Functional disorder; — and, 3. Organic lesions of the sexual organs. — 1st. *Mental influences or causes* may occasion *temporary*, or more or less *prolonged, impotence*, even in persons of a sound constitution in every respect. In them, the removal of the cause leaves the generative organs in a condition capable of performing their functions. The moral or mental influences, which most frequently occasion impotence, are, chiefly, too eager, too violent, or over-excited desire, affections of the imagination, and the depressing passions. Fear of incapacity, or of not being loved, timidity, shame, disgust, hatred, jealousy, surprise, terror, or any of the more violent mental emotions, most commonly have this effect. The first of these causes is, however, the most frequent; and the second, — the influence of the imagination, — the most powerful and permanent. In former times, when superstition, and a belief in the power of magicians, of incantations, of sorcery and witchcraft, prevailed, the state of the imagination was often not only the cause, but also the cure, of this affection; and, whilst incantations and other modes of impressing the mind were resorted to, for the purpose of destroying sexual power, amulets and charms were worn, not only for the purpose of guarding against their effects, but also for the restoration of this power, when lost or impaired. In the East and in Egypt, in Greece and in Rome, in uncivilised countries and in the seats of civilisation, until a belief in witchcraft ceased, these means were daily resorted to, as well as others, which could operate only through the medium of the imagination. The bane and the antidote were both confided in, however obscure, or impenetrable, or even absurd, either of them might have been. Montaigne was the first to penetrate and to expose the mystery of their operation. The twentieth chapter of the first book of his *Essays* will be read both with interest and instruction; and the thirty-seventh chapter of the second book will be found not less profitable to the practitioner of the present day.

6. 2d. *The generative function may be variously impaired*, and by diversified causes. — M. Virey remarks, with his accustomed desire of effect rather than of accuracy, that "the genital organs offer two states during life in the young and old, which are the frozen zones of existence, the intermediate period being the torrid zone of life. The child has nothing to give, the old has lost all." Instances, however, occasionally occur of genital precocity; and those in which the function continues till a late period of life, are by no means infrequent. The generative function appears with puberty, and continues until the sixty-fifth year, or even much later, unless impaired by excesses, or by local or constitutional disease. During, however, this long period, numerous circumstances tend to weaken or permanently to destroy it. The constitution and energy of the parents are sometimes the cause of the imbecility of the offspring. Children from premature connection, or of exhausted, aged, or worn-out persons, often inherit the incapacity of their parents, in respect both of the function in question, and of the system generally. Those, who are thus *hereditarily* or *constitutionally* impotent, are of a leucophlegmatic or lymphatic temperament; their soft solids, especially the fibrous and muscular structures, are soft, lax, and weak; their forms are rounded, from the superabundance of cellular and adipose substance; their hair is soft and fine, and deficient on the face and pubes; their frames are delicate and feminine; their voices are shrill, clear, sharp, or weak; and their testes are small and soft, the cords and scrotum being soft, lax, and pendulous.

7. Functional impotence is most commonly caused by premature or excessive venereal indulgences, and especially by the pernicious crime of manustrupatio. By these most injurious habits, the organs are excited to action before they are fully developed, and the seminal fluid excreted before it is duly elaborated. The muscles concerned in the generative function, and those also of the lower extremities, are either imperfectly formed, or have their energy remarkably impaired, so that they become susceptible, vacillating, and ultimately nearly paralysed. The imagination is morbidly acute or excitable, and erection imperfect, or frequent and momentary. The seminal and prostatic secretions are consequently weak, thin, clear, scanty, and serous; the whole frame, and particularly the nervous system, languish, and become enfeebled by the too frequent discharge of a fluid essentially vital, partly recrementitious, and necessary to their support; and ultimately the testes emaciate, or become soft. The variety of impotence noticed by Dr. Paris, depending upon a want of consent between the male organs of generation; or that in which erection takes place without discharge, or in which this latter occurs too quickly, and after imperfect erection; is most commonly the consequence of the causes just mentioned. But, in such, the evacuation consists chiefly of the prostatic fluid. General debility, from imperfect or unwholesome nourishment, may weaken the procreative energy, or render the desire less frequent, but it rarely destroys it altogether, or even for a time. Severe diseases, intense application to study, or to abstract inquiries or pursuits, have a still more remarkable effect in impairing, or temporarily destroying, the generative functions. In some instances, prolonged disuse of this function is followed by wasting of the testes, and, consequently, permanent impotence is the result. These organs, like others of the œconomy, are strengthened by moderate use, are weakened by abuse; their functions being often entirely lost by protracted disuse.

8. There are various other causes which may occasion functional impotence, particularly in certain constitutions; as the use of narcotics, espe-

cially of tobacco, hyoscyamus (MARC), cicuta, and opium. The sedative gases (FODERÉ), particularly carbonic acid gas, may produce it. Various refrigerants have a similar influence, as nitre, the carbonates of soda, camphor (DIEMERBROECK and LOSSIUS), and some cooling diuretics. The smell of camphor has long been considered as anaphrodisiac; and colchicum has certainly this effect, as noticed by DR. BEATTY. Soda water also exerts the same influence. The effect of these, however, are only temporary or partial. — Injuries of the spine or spinal cord, or of the head, particularly the occiput (MARCELLUS DONATUS, FABRICIUS HILDANUS, HENNEN); venæsection behind the ears (HIPPOCRATES); arteriotomy, &c.; have been considered causes of impotency. Of the influence of the first of these there can be no doubt. The use of mercury has been assigned as a cause; but it can hardly be viewed as such, unless carried to excess.

9. 3d. *Organic lesions* occasioning impotency, are — (*a*) Diseases of the generative organs or of adjoining parts; — (*b*) Malformations of these organs; — and (*c*) Deficiency of one or more of them. — Anaphrodisia from the *first* of these is often only temporary or relative; but from the *second* and *third*, it is generally absolute and permanent. *A*. The *diseases* which most frequently cause impotency are — *firstly*, those of the penis; *secondly*, of the testes; and, *thirdly*, of adjoining parts. *a*. The *penis* may be so excessively irritated as to occasion a temporary impotence by obstructing the opening of the seminal ducts and the urethra. Much more frequently, however, complete or partial paralysis, or deficient energy of the nerves, and consequently of the muscular and vascular action of the organ, occurs, constituting the *anaphrodisia paralytica* of authors. This latter state is merely an aggravated form of functional impotence, and most commonly produced as above stated. A singular instance in which the cells of the corpora cavernosa were apparently disorganised or altered by inflammation and suppuration, so as to prevent the influx of blood, and consequent distention of the penis, and to occasion impotence, has been recorded by MR. CALLAWAY. A similar change to this may take place in one side of the organ, and have nearly the same effect upon its functions.

10. Various obstructions to the seminal discharge occasion temporary or permanent impotency. The chief of these are strictures of the urethra, and disease of the seminal ducts. FODERÉ (*Med. Leg.* lib. i. p. 382.) adduces two cases, in which the powers of copulation existed, but without the seminal discharge. In one, the ducts were obstructed by hard concretions; in the other, they were constricted and callous. As stated by DR. BEATTY, the opening of the conjoined ducts of the vesicules seminales and vasa deferentia may be closed by scirrhous enlargement of the neck of the bladder, by enlargement of the prostate gland, by scirrhosity of the verumontanum, or by lesions of the duct itself. Strictures of the urethra can hardly be considered a cause of impotency, unless they are so extreme as not to permit the passage of a fine bougie. In the states of disease just mentioned, the inability of procreation arises from obstruction to the discharge of the seminal fluid, which is duly secreted; and when the obstruction is seated in the urethra, it may be removed by modern surgery. M. FODERÉ and DR. DUNLOP state that double scrotal hernia, by pressing upon the spermatic cords, sometimes causes as complete emasculation, as if the testes were entirely removed.

11. *b*. Impotency may also depend upon organic *lesions of the testes* — upon scirrhus, carcinoma, fungoid disease, or scrophula of these organs. But unless the whole structure of both organs be changed, the faculty of procreation may not be entirely or permanently lost. Uncommon smallness of these organs may occasion only temporary impotency; for this state may depend upon delayed evolution, or arise from the wasting consequent upon disuse. MR. WILSON mentions the case of a person, twenty-six years of age, in whom the penis and testes remained of the same size as in childhood. He married at this age, and at twenty-eight, the organs had reached their natural size. When, with smallness, there are remarkable flaccidity and softness conjoined, impotency is much more complete and even permanent. In a case of this kind in a strong young man, sometime under my care, no benefit resulted from treatment. Severe *bruises* of the testes may be followed by wasting or disorganisation of them. DR. J. G. SMITH alludes to this mode of making eunuchs, and states that it sometimes failed. I believe that most of the instances in which impotency has been said to have been produced by riding, have been owing to bruises or injury of these organs, or to the pressure to which they have often been subjected. Wasting of the testes may, however, arise without any very obvious cause. In the extreme case in which I was consulted, I was unable to ascertain its source. It occurred in a most robust and muscular young man, who would not admit that he had ever had recourse to excessive or vicious indulgence, or that he had been unusually continent, until his inclination ceased with the decay of the organs. FODERÉ states that it was a common disease among the labourers in the canal at Arles; and LARREY, that it was not uncommon among the French troops on their return from Egypt. It has sometimes occurred as a consequence of the metastasis of *Cynanche parotidæa* to the testes. — *Induration* of these organs, independently of scirrhous disorganisation, may be so great as to destroy their functions. According to M. ANDRAL, the seminiferous tubes are entirely obliterated, and the structure of the organ is hard, homogeneous, and without trace of organisation in cases of extreme induration. Impotence from inflammation of the testes is only temporary.

12. *c*. The *lesions of adjoining parts* occasioning impotency, are chiefly, uncommon obesity, very large scrotal hernia, and hydrocele. Neither of them requires any mark. A varicose state of the spermatic veins may also have this effect, when it is very remarkable. But I am unacquainted with cases in which this cause has been assigned.

13. *B. Malformations of the male genitals* may occasion impotency. Great size of the penis is seldom, and smallness of the organ is, perhaps, never a cause of it, if the functions of the testes are duly performed. According to ZACCHIAS, FODERÉ, BEATTY, and others, excessive size, particularly excess in length, may produce relative or temporary impotence, by injuring the female organs. The chief malformations of the penis having this effect absolutely or permanently, are those in which the urethra terminates in the pe-

rineum; and even in these, impregnation may be accomplished by art. John Hunter was consulted in a case of this description, and was induced, by the experiments of Spallanzani, to recommend the patient to collect the seminal fluid emitted from the perineum during intercourse, and to inject it into the vagina. Impregnation took place, and a healthy child was born in nine months.

13. In cases where the urethra opens in a part of the penis admitting of being introduced within the vagina, impotency may exist, but it is only relative; for procreation may be effected when the opening is thus situated, whether it be on the dorsum (*epispadias*), or on the inferior surface (*hypospadias*), as more frequently observed. Numerous instances are recorded by Simeons, Belloc, Kopp, Blundell, and Foderé, of impregnation by persons in whom these malformations existed. Mr. J. Hunter met with a case, in which the epididymis terminated in a cul-de-sac, instead of passing to a vas deferens. Dr. Beatty states, that a similar conformation sometimes exists in the vesiculæ seminales, where, instead of entering the urethra, they terminate, after being joined by the vasa deferentia in shut sacs. When these formations of the excretory ducts of the testes exist on both sides, absolute impotency necessarily results, but they are extremely rare.

14. C. *Deficiency of one or more of the male organs* occasions absolute or relative impotency. *a.* Congenital deficiency of the *penis* is rarely observed, and complete deficiency, still more rarely. Mr. Foderé mentions a case in which no vestige of the organ existed from birth. The testes were perfect, and sexual desire was not impaired. In most of the instances of congenital partial deficiency or malformation of the *penis*, recorded by authors, the urinary organs presented other malformations, particularly in respect of the urinary bladder and ureters. This is illustrated by several cases in Dr. Duncan's Memoir on this subject. (*Edin. Med.* and *Surg. Jour.* vol. xxv. p. 31.). *Accidental* deficiency of the penis is sometimes met with. The organ may have been either amputated or destroyed by disease. Some years ago, a surgeon, a friend of the author, was sent for in great haste. He found a man in a state of syncope from hæmorrhage proceeding from a very recent amputation of the penis close to the pubis. The strictest secrecy was preserved as to the cause and mode of amputation, which had evidently been effected by a sharp instrument.

15. The glans penis, and indeed the greater part of the organ, may be lost without causing more than relative impotency; and possibly, nearly all of it may be removed without producing an absolute loss of the procreative faculty, if the means resorted to by John Hunter (§ 12.) be employed. Instances of extensive mutilation of this organ, without destroying this power, are referred to by Frank, Paris, Beatty, and others; and although there is every reason to conclude that a complete removal of the penis will generally occasion impotency, yet the proper function of this part being to excite the female organs, and to convey the prolific fluid to the parts destined to receive it, if these purposes can be at all accomplished, impregnation may follow.

16. *b.* Congenital deficiency of the *testes* is rarely observed; and most of the cases in which these organs have been said to have been wanting, are merely instances of their retention in the abdomen. When they are not found in the scrotum, their entire absence can be inferred only from the history of the case, and from the state and appearances of the patient; for when they are altogether wanting, the usual characters of the male are partially lost, and those of the female assumed. As delay in the descent of the testes may arise from some imperfection, or delay of development, as J. Hunter reasonably infers, certain of the female characters may be presented, and yet these organs may exist nevertheless. The question then is, whether or not, the state of development, to which they may have attained, is sufficient for procreation. M. Marc adduces the case of a person of a feminine appearance, who yet possessed the full procreative power. The external characters cannot therefore always be confided in; but when all the external appearances of virility are present, although the testes are not found in the scrotum, there is every reason to infer that impotency does not exist; for numerous instances are on record proving that the mere retention of these organs within the abdominal ring does not affect the procreative power.

17. The congenital absence, destruction, or removal, of one testis is not a cause of impotency. It may however be a cause of relative incompetency and even of complete impotence, if the remaining one be soft, small, or withered. Castration, or the removal of both testes is followed by complete and permanent impotence, if it have been performed before puberty. But, subsequently to this period, the power of procreation may exist for a very short time after its performance, owing to the seminal fluid collected in the vesiculæ seminales previously to the operation. M. Marc supposes that the time taken for the cure of the wound is sufficient for the absorption of this fluid into the circulation; but the cases adduced by M. Boyer and Sir A. Cooper prove that a temporary power exists or is retained until the vesiculæ seminales are emptied. On this subject, the works of Paris and Beck will be consulted with advantage, for it hardly comes within the scope of this work.

18. II. Impotence and Sterility in the Female. A female may be impotent but not sterile, and she may be sterile, but not impotent; for, as respects the former condition, a state of the sexual organs may exist sufficient to prevent intercourse, and yet, upon its removal, impregnation may take place; and, as regards the latter condition, perfect competency to intercourse may exist, and yet conception may never occur. She may also be both impotent and sterile, or, in other words, were the impediment to due intercourse entirely removed, impregnation might not be effected. Sterility is very much more common than impotency in the female, and even than impotency in the male.

19. *A. The causes of* Impotence *in the female* are an impervious state of the vagina, absence of this canal, remarkable constrictions of it, the division of it by a septum running downwards from a double uterus, adhesions of the sides of the vagina, or of the labia, and the termination of the passage abruptly in a cul-de-sac. An impervious vagina may arise from changes in the soft parts, consequent upon protracted inflammation or irritation, the passage becoming first constricted or remarkably contracted, and ultimately obliterated. In a case respecting which I was consulted, a recto-vaginal fistula, seated at the upper part of the va-

gina, had occasioned so remarkable a contraction of the vagina, that its canal was almost obliterated, its parietes having become callous and indurated, A similar result may also follow a vesico-vaginal fistula. Foderé believes, that malformations of the bones of the pelvis may be so great as to prevent intercourse, but this can hardly be the case. Exostoses, however, on the internal or inferior surface of the bones of the pubis may have this effect, but their occurrence in this situation, and to this extent, must be very rare. Congenital absence of the vagina has been met with by Villaume, Moulon, Syme, and Warren; and absence of both vagina and uterus by Mott, Davis, Macfarlane, and others. In a case adduced by Foderé, the uterus and vagina were found, upon dissection, to constitute one solid mass, without any cavity in either. In a child, examined after death by Hufeland, no trace of genital organs, peculiar to either sex, was found, externally or internally. Although such instances are rare, there is no doubt that one or more of the different parts forming the female organs may be wanting. Congenital narrowness of this passage has been observed in a very few instances. In one or two of these, however, impregnation occurred, and the passage became enlarged in the progress of gestation. Contraction of the vagina was said to have existed in the celebrated Joan of Arc. The division of the canal by a septum has been met with in a very few cases only. Firm adhesions of the labia pudendi are not unfrequent in children, in consequence of neglected excoriation or inflammation. I have seen several instances of these adhesions of various extent, duration, and firmness. They are more rare in females after the age of puberty; but they have been met with at this age by Benevoli, Merriman, Ryan, Tucker, and others, and in some cases, they have been so complete, as nearly to prevent micturition. Inflammation or injuries, by instrument, or otherwise, during parturition, have been followed by adhesion of the sides of the vagina, and total obliteration of the canal. Several of the instances of obstruction by a strong membrane placed at the commencement, or in some part of the passage, recorded by Fabricius Hildanus, Ruysch, Ambrose Paré, Benevoli, Foderé, Physick, and others, may be imputed to adhesions long previously formed, which have subsequently assumed an organised and membranous state, rather than to an inordinately firm and resistant hymen. The hymen may, however, be thickened and hypertrophied, and be a cause of impotence by preventing intercourse. Yet impregnation may be effected nevertheless, as proved by numerous cases. This state of the membrane is therefore not productive of absolute impotence, even should it be allowed to continue; and it is not a permanent cause, as it may always be removed by an operation. Complete prolapsus or procidentia of the uterus, retroversion of the uterus, prolapsus of the vagina, cancer of the vagina or uterus, and extreme brevity of the vagina, are generally productive of impotency, although impregnation has occurred in rare instances, notwithstanding these lesions.

20. *B.* Sterility may proceed from absence of the uterus, or of the ovaria, or of both, When the uterus is wanting, the vagina is usually short. It may also proceed from a scirrhous or indurated state of this organ, from tumours in its substance, from polypi in its cavity, or attached to its neck, from occlusion of the Fallopian tubes, or adhesion of their fimbriated extremities to adjoining parts, from narrowness or entire obstruction of the os uteri, and from disease of both ovaria. Several of these require further remark. Extreme constriction of the os uteri has been shown by Dr. Macintosh to be productive of difficult, painful, or obstructed menstruation, and it most probably is also one of the causes of sterility. The mouth of the uterus may be completely obstructed by agglutination of its sides, or by a false membrane stretched across it, either internally or externally. The openings of the Fallopian tubes may be also closed by a membranous production, or by an albuminous exudation from the internal surface of the uterus. The tubes may be either partially or altogether obliterated, in consequence of the extension of inflammatory action to them, from the uterus or adjoining parts. When these alterations extend to both tubes, sterility must necessarily result. Although tumours developed in the body or neck of the uterus, and polypi attached to its internal surface, generally prevent impregnation, yet instances have occurred, in which conception has nevertheless taken place. These are however, very rare, and abortion has always occurred during the early months. A tumour or polypus may be formed on the internal surface of the uterus, and yet after its removal, the patient may conceive and bear a child at the full time. A case illustrative of this has been recorded by Dr. Beatty.

21. The above causes are mostly productive of absolute or permanent sterility; but there are others, which are either relative, or admit of removal. These are chiefly, too profuse, or too frequent, and difficult menstruation, constant or profuse leucorrhea, inflammatory affections of the uterus, or of its appendages, dislike, disgust, and indifference on the part of the female, &c. Profuse or frequent menstruation is a more common cause of sterility than is generally supposed; this state, particularly when associated with irritation of, or increased vascular determination to, the womb, preventing the retention of the ovum, until it has undergone the changes necessary to its attachment to the uterus. Leucorrhea is a cause of sterility chiefly when it depends upon inflammatory irritation of the internal surface or neck of the uterus, or when the secretion proceeds from relaxation of the vessels in this situation. When it is a consequence of inflammatory action, sterility may continue after the discharge has ceased, owing to organic changes in the surface of the uterus, or in the Fallopian tubes, especially the formation of a false membrane in the former, and the production of an albuminous exudation in the canals of the latter, or consequent obliteration of them. When barrenness depends upon leucorrhea proceeding from local relaxation, or general debility, it may be removed upon the disappearance of its cause. Delayed, retained, obstructed, or suppressed menstruation frequently occasions sterility. Some females have, however, conceived, who have never menstruated; and the mere suppression or obstruction of the catamenia may or may not prevent impregnation; various other contingent changes, or concurring circumstances, either favouring or preventing this result. Difficult menstruation is sometimes a cause of sterility, but its influence also will depend much upon other circumstances. That form, however, of dysmenorrhea, described

by Dr. DUNCAN and Dr. DEWEES, which appears to depend upon the formation of a membranous substance in the uterus, having a strong resemblance to the decidua, is very generally productive of barrenness; but this is only one of the several forms which subacute or chronic inflammation of the uterus assumes, either of which may occasion temporary or permanent sterility.

22. There are other causes of temporary or relative sterility. Among these the most common are too frequent, yet inefficient sexual intercourse, too early marriages, general ill-health, and debility or exhaustion of the female organs, owing to premature or too frequent excitement. Various circumstances connected with sterility in prostitutes have, perhaps, thrown some light upon certain of the causes of this state; and particularly the fact, that many of this class have had children after marriage, or after relinquishing promiscuous intercourse. Numerous instances have occurred of females who, having been obliged to marry contrary to their inclinations, have not conceived, and yet have had children from a second marriage. It is generally understood by females of all ranks in society, that indifference during intercourse, or suppression of the orgasm will prevent impregnation; and, although they are sometimes deceived in this respect, yet their inference is correct in the majority. This is one of the principal causes of the sterility of prostitutes, other circumstances, however, besides those just alluded to, combining with it, to produce this effect in them.

23. III. TREATMENT. The treatment of impotence and sterility depends entirely upon the causes of either the one or the other, as far as they can be known. Many of these causes may be fully ascertained, and the consequences correctly anticipated; but as to the existence of others, inferences only can be drawn from a number of circumstances, and these inferences cannot be always fully confided in. Most of the organic lesions and deficiencies, enumerated above, cannot be remedied, yet a few of them may be assisted by art, either temporarily or permanently. But many of the functional and moral causes, and their effects, may be entirely removed. Absence of an organ or part essential to the function of generation in either sex is generally productive of impotence and sterility. Yet an imperfection only, and disease, of one or more of these organs occasioning either inability in the male or barrenness in the female, may be remedied. Adhesions of the prepuce to the glans penis, phymosis, strictures of the urethra, fistulous openings in the course of the urethra, some of the diseases of adjoining parts that prevent intercourse, paralytic and debilitated states of the penis, and the slighter injuries of the testes, may be permanently removed, and their consequences disappear. Contractions of the vagina, and even constriction or narrowness of the os uteri, occlusion of the entrance of the vagina by adhesions of the labia, or by a morbidly dense hymen, or by a false membrane, prolapsus or procidentia of the uterus or vagina, uterine polypi, leucorrhea, difficult or painful menstruation, and inflammatory states of the uterus may be severally remedied, and, although sterility may not be always, it will be frequently, also removed.

24. Cases of impotence and sterility from moral and functional causes are the most common; and, although they require the most scientific and judicious treatment, yet the mental, as well as the physical imbecility, that often characterises them, brings them more frequently in the hands of pretenders and emperics, than in those of the qualified practitioner. The cases which proceed from these causes may be arranged into 1st. Those which depend upon exhaustion; 2d. Those which proceed from disuse, or from an imperfect exertion, of the function; and, 3d. Those which arise from excessive mental and physical excitement, relatively to the susceptibility and sensibility of the nervous system.—*a*. When impotency and sterility proceed from *exhaustion*, or from a premature decay of the generative functions, owing to premature, unnatural, or excessive excitement, the treatment is nearly the same in both sexes, according as either may be chiefly or solely affected. In these cases the indications are, to restore — 1st. The energies of the constitution; and 2d. The functions of the procreative organs. To attempt the second, without either previously or contemporaneously fulfilling the first indication, will generally be futile, and often injurious. Persons, who are thus exhausted, sometimes perpetuate their infirmity by having recourse to noxious excitants, and to the means advised by emperics. The scientific practitioner will be guided in the selection of remedies, by the causes, circumstances, and phenomena, connected with the case; and he will find it necessary to associate a moral or mental regimen with the physical means which may be required. When the affection depends upon an excited imagination, in connection with a depraved habit, the former part of the treatment is the most necessary, but the most unpleasant for the physician to prescribe, and the most difficult for the patient to adopt. In these cases the mental weakness has advanced, *pari passu*, with the constitutional and local infirmity, until the mind has become incapable of exerting its more reflecting and moral powers. It will, therefore, be often necessary to restore the energy of the nervous system by suitable diet, appropriate medicines, regimen, occupation, and change of air, before the moral part of the treatment will receive due attention from the patient.

25. In other and slighter cases, the debility is principally local, the general health as well as the mental energies, remaining only partially or but little impaired. In these, the local, constitutional, and moral means of cure, will frequently prove successful, especially in the male. In this sex, when the inability depends chiefly upon weakness of the sexual muscles, invigorating modes of treatment, general and local, usually remove it, if its causes be avoided. In all these, attention to the digestive and secreting functions, vegetable or mineral tonics, especially the preparations of iron, and chalybeate mineral waters, the shower bath, or the cold salt-water bath with regular exercise in the open air, mental occupation, and early hours, will generally be most beneficial. Where the patient is subject to discharges from the urethra upon passing a stool, or on the excitement of sexual desire, a turgid and irritable state of the prostate gland may be inferred. When he, is liable to frequent emissions during sleep, an irritable condition of the testes, and of the *vesiculæ seminales* obviously exists. In these, the more cooling tonics and the more astringent chalybeates may be employed, particularly the mine-

ral acids, alone or with bitter infusions, and the tincture of the muriate of iron, aided by the regimen already stated. When the general and local astheniæ are great, a moderate use of wine, of warm spices and aromatics, with as full and nutricious diet as the digestive organs can dispose of, will also be requisite. But the mental and local causes of sexual excitement should be avoided, so that the function should not be exerted beyond what may be necessary to restore and to fortify it.

26. When impotence in the male depends upon a too frequent exertion of the sexual function, the means of cure are sufficiently obvious. Yet the patient may be unable, from mental or nervous weakness, to exert the control necessary for its cure. In such a case the usual restorative remedies should be prescribed, especially chalybeates and cold sea-water bathing. In most of these, the male organs are so irritable, that their functions are performed too rapidly and imperfectly, or before the organs, more or less necessary to procreation, can be excited in the female. At the same time, the male secretions are inadequate, particularly in respect of elaboration and retention in the *vesiculæ seminales*, for the accomplishment of the purpose for which they are intended. This form of male impotence and sterility is commonly produced by masturbation, and is most benefited by whatever will improve the general health, and restore the tone of the sexual organs. Attempts at intercourse in these cases should not be more frequently than may strengthen or promote the function, without exhausting or weakening it.

27. The *other states* (§ 7, 8.) of functional impotence and sterility above alluded to, hardly require a particular notice, as they are temporary only, and soon disappear, as circumstances generally arise which soon remove their causes. It is, indeed, chiefly to the removal of the causes, that the attention of the physician should be directed, in the treatment of this complaint in both sexes.

28. In ancient times, and recently in some countries, both civilised and savage, the removal of impotency and sterility by the use of heating substances, supposed to possess aphrodisiac properties, was generally attempted. The prematurely aged, worn out debauchees, and the community generally, in some parts, especially in China, Japan, Africa, &c., often employ substances which are reputed to possess these properties. But the effects they produce, when they produce any, are more commonly injurious than beneficial. Musk, ambergris, cantharides, phosphorus, opium, the hot spices, aromatics, coffee, vanilla, borax, genseng, castor, saffron, &c., are supposed to possess aphrodisiac virtues; and a diet consisting principally of fish or of shell-fish, has a similar repute. Circumstances may arise in which it may be proper to prescribe certain of these, as possessing stimulating and restorative properties; but others of them ought to be employed with extreme caution, particularly cantharides, phosphorus, and borax. The nostrums said to possess the virtues in question ought not to be resorted to. Certain articles of food, as pigeons, eggs, particularly raw or undressed eggs, caviàre, herrings recently pickled, oysters, truffles, &c., may be employed, as being at least harmless; but the less that heating medicines are prescribed the better, unless under certain circumstances, which may occur to require them; as in cases where the sexual function has not been restored after exhausting and depressing diseases, or after prolonged exertion of the mind on abstract subjects. I was very recently consulted by a gentleman about forty, who had no return of the sexual function after a severe attack of influenza a twelvemonth before. He had perfectly recovered from it in other respects for several months, and the remaining imperfection was a source of distress to him. In a case of this kind, the physician should at least know the means most likely to be of service, particularly as the inability may become a matter of family trouble, as well as of individual misery. KÆMPFER states, that a combination of musk, ambergris, opium, and aromatics, in the form of small pills, are much employed by the Chinese and Japanese as an aphrodisiac; and I believe that it is not without some degree of efficacy. But it is very obvious, that the prolonged or too frequent recourse to these and similar substances is most injurious, both morally and physically.

29. The *sterility of females* must be treated with strict reference to the causes, as far as they may be ascertained or inferred. When it is chiefly functional, and induced by exhaustion, or by the noxious practices already alluded to, the means of cure are very nearly the same as have been here recommended, especially attention to the digestive and uterine functions, the use of chalybeates, or of chalybeate or other tonic mineral springs, with air, exercise, and early hours. For them also, the cold salt-water bath, the shower bath, or the salt-water *douche* on the loins, will also be of great service. The importance of a due regulation of the mind, of healthy occupations, and of abstemiousness, should be duly estimated.

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INDIGESTION. — Syn. Δυσπεψια (from δυς *with difficulty*, and πεπτω, *I digest*), βραδυπεψια, απεψια, Gr. *Concoctio tarda*, *Stomachi resolutio*, *Cruditas*, *Indigestio*, *Passio Stomachia*, Auct. Lat. *Apepsia*, Vogel. *Soda*, Linnæus. *Anorexia*, Sagar. *Bradypepsia*, Sauvages. *Dyspepsia*, Swediaur, Cullen, Parr. *Dyspepsia Simplex*, Young. *Limosis Dyspepsia*, Good. *Schwere Verdauung*, *Uebel Verdauung*, Germ. *Indigestion*, Fr. *Indigestione*, Ital. *Bad digestion*, *Slow digestion*, &c.

Classif. — 2. *Class*, Nervous Diseases; 2. *Order*, Defect of Vital Energy (*Cullen*). 1. *Class*, Diseases of the Digestive Function; 1. *Order*, Affecting the Alimentary Canal (*Good*). I. Class, I. Order (*Author*, in *Preface*).

1. Defin. — *Impaired or fastidious appetite; slow and difficult digestion; sensations of discomfort referrible to the stomach, and frequently costiveness.*

2. *Dyspepsia* or *indigestion* has been employed as the generic designation of several disorders ranged under it as species, by most modern writers, and particularly by Sauvages and Cullen. Young and Good have limited the meaning of the term, by considering some of those disorders as altogether distinct from it. Dr. Todd, however, in an able and comprehensive article on the subject, has applied this term to all the functional disorders of the alimentary canal. Having discussed several of the affections viewed by some writers as species of indigestion, in separate articles, according to their natures and seats (see articles, Cœcum, Colon, Costiveness, Duodenum, Flatulency, Pyrosis, Stomach, *Painful affections, and inflammation of*), my observations, at this place, will necessarily be confined to the simpler forms of this disorder.

3. *Indigestion* is either *primary* or *secondary*, — *idiopathic* or *symptomatic*, *simple* or *complicated*. When it is *complicated*, it may have been either the primary or the secondary affection. Dr. Todd distinguishes between symptomatic and sympathetic dyspepsia; and remarks that, "a *secondary* dyspepsia may be conveniently divided into *symptomatic*, forming only a part of a more general disease, and *sympathetic*, the consequence of consent with the disorder of some other organ." The distinction is, in some respects, wanting in precision, but it may be preserved as being one usually recognised.

4. The *varieties* or *forms* of indigestion have been variously described, named, and arranged, by the numerous recent writers on this disorder; and a most eager disposition has been evinced by all, to assign new terms, and to devise distinct pathological states, for each. In some instances, distinctions have been multiplied to an extent bewildering the inexperienced, and beyond the actual morbid manifestations of the organs affected. It will be readily admitted, that different forms of indigestion will depend upon different states of the stomach, and of its associated viscera; that, in one, the organic sensibility will be especially affected; in another, the secretions; in a third, the muscular contractility; in a fourth, the circulation; in a fifth, two or all of these functions; and that these particular affections will be variously associated with disorders of the liver, or of the pancreas, or of the duodenum, and not merely with these, but with others in remote organs. Yet these individual affections, even in their simpler or less complicated states, will seldom be manifested by symptoms enabling the most close observer to determine, with precision, which of them is the one actually present, either in a simple or predominant form, or the exact associations to which it may have given rise. It will, therefore, be proper not to multiply distinctions beyond those which will be found useful for practical purposes. The disorder which proceeds from a simple diminution of the functions of the stomach, — from impaired secretion, weakened organic contractility, and languid circulation — from asthenia of the organ, — will, with propriety, form one variety of indigestion; and that which depends upon a state of erethysm, or vascular irritation, approaching, but not amounting to, inflammation of the villous surface, will constitute another. This latter, especially, will present certain modes, according as the sensibility, the villous membrane, or the follicular apparatus, is prominently affected. Those states of disease which are generally consequent upon dyspepsia, although sometimes appearing independently of it, and which have been classed by some writers as severer forms of this complaint, will be found under the heads referred to above.

5. I. Description. — i. Simple Asthenic Dyspepsia; — *Stomachi Resolutio*, Celsus, — *Frigiditas Stomachi*, Prosper Alpinus, — *Dyspepsia Idiopathica*, Cullen, — *First Stage of Indigestion*, W. Philip, — *Atonic Gastric Dyspepsia*, T. J. Todd, — *Dyspepsia per Asthenie de l'Estomac*, Andral, — *Dyspepsia Apyrétique As-*

thénique, BROUSSAIS; — is *characterised* chiefly by a sense of distention of the stomach, by acrid or acid eructations, and flatulence, soon after a meal; by loss of appetite, or loathing of food, and occasionally by nausea. These symptoms, however, vary with the nature and quantity of the food. Heartburn, nidorous or putrescent eructations, and a feeling of weight or oppression at the epigastrium, are generally present after a very full meal, particularly of fat, oily, or rich meats. The tongue is pale, flabby, whitish, slimy or coated, and often indented by the teeth; the bowels are costive, sometimes irregular; the urine is pale, copious, and occasionally deficient of urea, or contains albumen; the pulse is softer, weaker, and often slower than natural; the temperature is diminished, or irregularly distributed, the extremities being cold, and the surface pale, or flaccid; the eyes are languid, and the physical and mental powers deficient in vivacity and energy. The symptoms, however, vary much in grouping and intensity with the kind, quantity of the solid and fluid ingested, with the temperament and constitution, and with the manner in which associated viscera are sympathetically affected. In some cases, they are gradually and very slowly developed by the continued operation of the causes; in others, they are more rapidly or suddenly induced by errors in diet, or by other powerful circumstances.

6. *A.* The latter, or the *more acute* and *sudden attacks of indigestion*, are generally consequent upon some manifest cause, particularly an overloaded state of the stomach, — and is identical with the *cruditas* of the ancients, and the *embarras gastrique* of the French. — It may occur, however, from substances which disorder the organic sensibility of the viscus, or from other causes. When it proceeds from this source, the symptoms soon follow a full meal, or appear in the morning. The patient experiences various uneasy or even painful sensations, with oppression or weight at the epigastrium, and heart-burn. These often extend to the pharynx. The tongue becomes dry, clammy or loaded, and the taste is lost or perverted. Rancid, oily, indigested, or acid substances are eructated or brought off the stomach, without nausea or retching. There are generally headach and languor. If nausea and vomiting take place, the contents of the stomach are thrown up, either partially or altogether undigested, with a ropy phlegm. Where vomiting does not occur, a sense of irritation or constriction of the fauces and pharynx, with a copious secretion of a watery fluid, and pains in the stomach, are often present. The appetite is abolished, or savoury articles of food are only relished. When the fit of indigestion occurs during the night, the patient experiences frightful dreams, or the nightmare, or spasmodic twitchings of the limbs, or severe pains in the stomach or bowels, or wakens with severe headach. The pulse is weak, languid, or soft; the skin cool and moist, and the extremities cold. Frequently chills, horripilations, formications, or even slight shudderings occur. Various sympathetic affections often attend this state of dyspepsia, particularly headach, as described in that article, impaired or indistinct vision; muscæ volitantes, noises in the ears, and dullness of *hearing;* disorder or impairment of the senses of taste and smell, palpitations, and vertigo, colicky pains in the abdomen, costiveness, &c.

7. An attack of dyspepsia in an acute or sudden form seldom appears, unless from the causes just alluded to. But it may proceed, particularly in delicate persons or females, from other causes, as powerful mental impressions, long fasting, or deprivation of wonted stimuli. In such cases, vomitings, or even retchings, rarely occur; but nausea or disgust at food, giddiness, headach, faintness, sinking or pain at the epigastrium, costiveness, palor and coldness of the surface, and inactivity, with irritability of temper, with some of the other symptoms already noticed, are commonly complained of. — These *acute* attacks are liable to pass into the more *confirmed* or chronic state of the complaint, next to be described, particularly when they recur frequently, or are neglected.

8. *B.* The *confirmed* or chronic form of dyspepsia may take place gradually or slowly, or as a consequence of the foregoing. In the former case, it is almost imperceptible in its progress, but it generally commences with symptoms of general, as well as local, debility. All the physical and mental functions betray more or less inactivity. The sleep is disturbed or unrefreshing, sometimes heavy or prolonged. The appetite in the morning is impaired and capricious, savoury articles being chiefly relished, and a sense of soreness or relaxation in the throat is often complained of. A full meal is followed by heaviness, yawnings, stretchings, and an almost irresistible disposition to sleep, by sense of fullness, weight, flatulence, or by rancid or acrid eructations, &c. As the disorder continues, the appetite is more impaired and more capricious. The bowels become costive or irregular; the discharges being scanty, offensive, discoloured, or more copious or frequent, and sometimes containing imperfectly digested portions of food. The biliary secretion is either insufficient or disordered. Perspirations are copious on exertion, often offensive, and quickly discolour the linen. Flatulence is troublesome, particularly when the stomach is empty; the mouth is clammy, and the tongue loaded or furred, especially in the morning. The countenance becomes pale or unhealthy; and the body occasionally enlarges about the trunk or abdomen. Vertigo, loss of memory, lowness of spirits, apathy, indifference; and numerous associated and sympathetic disorders supervene, according as the asthenia of the stomach extends to the duodenum and intestinal canal, or to the secreting collatitious viscera. In many cases, the affection extends along the æsophagus to the pharynx and fauces, occasioning the slightest forms of angina, or simple relaxation of the uvula.

9. As dyspepsia becomes confirmed, various additional sympathetic affections appear. Indeed there is scarcely a viscus, that may not betray disorder. Irritation about the larynx, chronic cough, particularly in the morning; huskiness of the voice, or hoarseness; copious perspirations, and eruptions on the skin; dry and parched state of the hair, or morbid condition of the cuticle and of the nails; great sensibility of cold, and also of heat; are very commonly observed. Shortness of breath on slight exertion; palpitation of the heart; intermissions and irregularity of the pulse; and other sympathetic disorders about to be noticed, often also appear. This variety of indi-

gestion, when neglected, or when its causes continue in operation, sooner or later passes into one or other of the forms of the variety, next to be described.

10. ii. Indigestion with vascular Erethism, —*Irritative Dyspepsia; Cardialgia Inflammatoria,* Sauvages, — *Gatsrite Chronique,* Broussais, — *Second Stage of Indigestion,* W. Philip, —*Inflammatory Gastric Dyspepsia,* T. J. Todd, — is *characterised* chiefly by slow and painful digestion, a sense of heat and discomfort at the epigastrium, increased by food and by pressure, with thirst, dryness of the mouth and fauces, redness of the edges and point of the tongue, whilst the middle and root are white, loaded, or furred; costiveness, high-coloured urine, partially increased temperature and dryness of the skin, and a more frequent and sharp pulse than natural. It offers several *grades* of severity and various *modes*, according to the exciting cause, the temperament of the patient, and to the manner in which the organic sensibility and contractility, the secretions and associated viscera, are individually implicated. It may appear suddenly in an acute form, when the cause has been active, or gradually and slowly, either primarily, or consecutively upon the variety already described.

11. *a.* In the *slighter states* of irritative dyspepsia, the appetite is often increased, occasionally ravenous, in some instances impaired; thirst is generally present, particularly in the evening. The extremities are often cold; but burning or heat of the soles of the feet and palms of the hand frequently occur, particularly in warm or temperate weather. The point and edges of the tongue are red, the papillæ raised or excited, and the root more or less loaded; the bowels are confined, and the stools dry and scanty. The pulse is somewhat excited, especially in the evening, and rather sharp than hard or contracted. Headach, sometimes with slight redness of the conjunctiva and contraction of the pupils, heaviness, unsound sleep, unpleasant dreams, and a feeling of fatigue and lassitude upon waking, are generally present. The symptoms referred directly to the stomach, at first, are often not more severe in this, than in the preceding, variety; and pain, with tenderness on pressure, is not more frequently complained of. As the complaint, however, becomes more chronic, a burning pain is felt at the stomach, and is increased by a full meal and by pressure. Great discomfort and a sense of a load are referred to the region of this organ. Fulness or distension at the epigastrium, often extending to one or both hypochondria, is usually present. When heartburn occurs, it is characterised by a sense of heat or burning, and attended by redness and soreness of the fauces and pharynx. The tongue and throat are frequently dry, and the voice soon becomes husky on speaking, or on exerting it. Small vesications occasionally appear on the sides and points of the tongue, and more rarely excoriations on the fauces. In protracted cases, the tongue is often smooth, sometimes slightly fissured or chapped, or lobulated, or even glossy. Pain is felt in the left shoulder, or in the left hypochondrium, extending to the shoulder blade, or between the scapulæ, and beneath the sternum. Severe headach; irritability of temper; depression of spirits; impaired appetite; palpitations; a harsh, dry state of the skin, frequently with scaly eruptions; occasional bursts of perspirations during sleep; inability to lie on the left side; burning heat in the palms of the hands and soles of the feet; increased acuteness of the senses, or obscuration of certain of them; and a morbid state of all the excretions, severally appear, and often divert the patient's and practitioner's attention from the source of disorder. In some cases pain, often increased by flatulence, shoots through the hypochondria and chest, and a symptomatic cough, with slight greyish expectoration in the morning, is excited, owing to nervous connection, and to the extension of irritation to the pharynx and top of the larynx. In these, pectoral disease is sometimes suspected; and inflammatory irritation of the larynx may be actually thereby occasioned.

12. *b.* In the more *severe or acute attacks* of this variety of indigestion, particularly when produced by hurtful or indigestible food, or stimulating liquors, there is a total and sudden loss of appetite, with nausea, retchings, or full vomiting, increased by, or instantly following, the ingestion of substances into the stomach. Occasionally, the contents of the organ are regurgitated without effort or nausea, but with pain or a sense of constriction at the epigastrium and hypochondria. The pulse, is at times, but little affected; at others, quick and sharp, and the skin is harsh and hot; but perspirations break out when free vomitings are induced. There is always thirst; pain, or a sense of burning, of scalding, or of soreness is generally felt in the stomach, and it often extends, in the course of the œsophagus, to the throat; giving rise to a similar symptomatic affection of this part, and of the larynx and chest, as just noticed (§ 11.). In rare instances, however, where the retchings and vomitings are frequent and severe, but little pain, and no tenderness in the epigastrium are present, or much less than the severity of the symptoms indicates. The copious discharge from the mucous follicles and exhalents of the villous coat in these cases, removes the congestion of vessels, or the morbid conditions productive of pain and tenderness in other cases. But the symptoms vary remarkably with the exciting cause, with the temperament and disposition of the patient, and with the previous disorder and existing state of the collatitious viscera.

13. *c.* In the *aged*, or in *young persons of a phlegmatic temperament*, and in *cold* or *damp climates* and *seasons*, irritative dyspepsia assumes a form which has been denominated *Anorexia pituitosa, Anorexia Catarrhalis, Catarrh of the Stomach,* &c., by various writers. Dr. Todd has called it *Follicular Gastric Dyspepsia;* and most probably it proceeds from an inordinate and morbid secretion from the follicles of the stomach, that irritates the organ; but he has improperly confounded it with *Pyrosis,* which it closely resembles. It is characterised by an aching pain, by gnawing, or by a sensation of cramp, weight and uneasiness, or soreness, felt chiefly in the morning, when the stomach is empty, by loss of appetite, nausea, and sometimes by vomiting of a ropy, transparent, glairy, and tasteless fluid. It is often complicated with, or consequent upon, severe catarrhal affections of aged or phlegmatic persons, and is not infrequent in rheumatic constitutions, after errors in diet, and the use of indigestible, rich, or incongruous articles of food or drink. In this case, it usually occurs in the night and fol-

lowing morning. Along with indigested substances, a very large quantity of this colourless glairy matter is thrown up, and often continues to be ejected for a considerable time afterwards. M. Andral has seen it thrown off in very large quantities, independently of the irritation of offending matters; but these matters are more commonly concerned in keeping up the morbid secretion. In most of the cases I have seen, the pulse was soft, languid, sometimes sharp during the attack, which was attended by a foul, loaded, or sodden state of the tongue, a warm perspirable surface, or free perspiration, much depression of nervous power, and constipation; but there was little or no thirst, nor tenderness or increase of pain on moderate pressure of the region of the stomach. Flatulence, eructations of an insipid or slightly acid fluid, a copious flow of saliva from the mouth, or of a watery fluid from the pharynx, and oppression or distention of the stomach, although pain is much abated, after eating, generally accompany the disorder. This form of irritative dyspepsia is often preceded or attended by severe catarrhs, by dyspnœa, or humoral asthma, or by rheumatic affections; and it is most common in cold and wet seasons, when these are prevalent. In its slighter or less acute states, or when appearing independently of over-distention or irritation of the stomach by bulky or indigestible substances, the pulse is usually slow or soft, the extremities cold, the evacuations scanty or mucous, and the tongue white, sodden, or loaded. As Dr. Todd remarks, there is a frequent desire to take food, with thirst, and, as the disease continues, there is wasting of the flesh. The uneasiness caused by the laborious digestion subsides as the process is finished; but before the time of taking food arrives, the stomach becomes irritated by its own secretion, which produces all the inconvenience of a foreign indigestible substance in that organ; such as a sense of sinking, of dragging, of nausea, faintness, gnawing, or erosion, which are again, for a time, relieved by the taking of food. (See art. Pyrosis.)

14. iii. Of certain Symptoms of Indigestion. — *A. Cardialgia*, or *Heartburn*, presents itself in two forms, each of which assumes various grades of severity. It is generally attended by *acid* or acrid eructations, exciting irritation in the throat and fauces. The acidity of the eructated matters is often remarkable, occasioning the most unpleasant sensations in the mouth and pharynx, with a copious flow of fluid from those parts. The matters brought up from the stomach are sometimes rancid and *alkaline*, particularly after a full meal of rich or fat animal food. In this case, a feeling of disgust is excited on each eructation, and large quantities are thus thrown off, or regurgitated from the stomach, without either nausea or retching. In either form, unpleasant gnawing, burning pain, and tenderness, are felt at the epigastrium, with distention, extending to the hypochondria, and with tightness or oppression in the chest. Cardialgia chiefly occurs during the period of digestion, but sometimes not until an advanced stage of the process. It may be mild, and consist simply of uneasy sensation, gnawing, or burning at the cardia, sometimes with slight faintness or flatulence; or it may be severe, the uneasiness extending over the region of the stomach, attended by depression, anxiety of countenance, and faintness. This latter state has been denominated *sinking heartburn*. It is only when cardialgia i ssevere ,that it is accompanied with frequent and copious, rancid, alkaline or septic eructations.

15. *B. Of the Evacuations, &c.*—*a.* The *stools* furnish comparatively little information in dyspeptic ailments, when only those procured by an active purgative are examined. They are most commonly scanty, dry, and deficient in healthy odour and colour, especially in the asthenic and simple states of the complaint. In the irritative states, the discoloration is often greater, and they are occasionally mucous or watery, particularly when irritation extends along the alimentary canal. But in either variety, they vary remarkably in colour, consistence, and character; being either dry, pultaceous, slimy, scybalous, mucous, bilious, clayey, whitish, or yeasty, and sometimes presenting several of these appearances at the same time. The calls to evacuation are commonly rare or delayed, but they are occasionally frequent and inefficient. It is chiefly when torpid or disordered function of the liver, duodenum, or intestinal canal, is associated with indigestion, that the states of the evacuations described by Dr. W. Philip are met with; for these states, as Dr. J. Johnson justly contends, are not common in the simpler forms of the complaint. "The alvine discharge," the former writer remarks, "sometimes chiefly consists of bile; its colour at other times is too light, more frequently too dark, and occasionally almost black; at different times it assumes various hues, inclining to green or to blue; and sometimes it is mixed with, and now and then almost wholly consists of, undigested bits of food." When there is much straining, it often contains mucus, sometimes in distinct masses, or substances resembling bits of membrane. "It frequently separates from the canal with more difficulty then usual, and leaves a feeling of the bowels not having been completely emptied."

16. *b.* The *urine* of a person in good health is perfectly clear and limpid when passed, and continues so for some time after it cools, being more or less deep in colour, according as its ingredients are concentrated or diluted. But it has been satisfactorily shown, that when acidity is prevalent in the stomach and digestive canal, or when the usual acid secretion of the skin is impeded or suppressed, the urine, after standing for some time, deposits a reddish substance, which is found to be a coating of lithic acid, the supernatant fluid still remaining clear; but when an opposite condition to this exists in the digestive organs, the contents of the stomach being alkaline or devoid of their proper acidity, and when the function of the skin is unusually excited, the urine becomes turbid, and a whitish, or purulent white, sediment is observed, consisting of lithate of ammonia, or of an amorphous deposit of phosphates and lithates. If irritation or inflammatory affection of the stomach is present, this fluid is scanty and high-coloured. In irritability of the organ, it is often pale, limpid, and very copious. In several states of indigestion, it occasions smarting in its passage, owing to the unusual abundance of urea. Dr. Prout observes, that in one or two cases of obstinate dyspepsia, he has seen the urine not only passed of a bright pink colour, but remain so on cooling, without depositing any sediment; and he considers this pink colour to proceed from the large quantity of purpurate of ammonia present, which, from there being no lithate of ammonia with which it might be combined, was necessarily held in solution.

17. *c. Pain and tenderness at the epigastrium* and region of the stomach have been much insisted upon by Dr. W. Philip, as indicative of the more inflammatory states of dyspepsia. But as I have shown elsewhere (see Stomach — *Morbid Sensibility of*), the most severe pains in this organ are often felt without any inflammatory disposition. Tenderness upon pressure is a very common symptom in the slight or more functional states of indigestion, as well as in the severe or more inflammatory, especially in thin and delicate persons. It is seldom wanting in irritative dyspepsia. The tenderness is often connected with *fulness* in this region, and also in the hypochondria. But this latter symptom is generally owing to the distention caused by flatus, and by feculent and flatulent collections in the colon. When emaciation takes place in protracted cases, the fulness becomes more apparent.

18. *d.* The *pulse*, in dyspepsia, is extremely various, but it is most commonly as I have described it. During the digestion of a full meal, it is usually accelerated, and somewhat harder or sharper than usual. The hardness insisted on by Dr. W. Philip, as indicative of the passage of functional into inflammatory dyspepsia, is seldom present. Sharpness and quickness are more frequently observed, and are symptoms of irritation rather than of inflammation. The febrile symptoms occasionally occurring, with soreness of the throat, high-coloured urine, and impaired secretions, are more probably occasioned by the former, than by the latter pathological state.

19. C. *Of the states of the associated viscera in dyspepsia.* — It is obvious that indigestion will vary in form and severity, with the concomitance of disorder in any of the other digestive organs. — The functions of the Duodenum may be deranged, as shown in that article; and, in this case, dyspepsia will present more or less of the characters there described (§ 2.). Other parts of the digestive canal may be deranged, the affection consisting either in impairment of function, or in nervous or vascular irritation, and being limited to the small intestines, or to the large bowels, or even to one only of the latter. (See arts. Cœcum and Colon.) In such cases, the physician will be guided by the state of the evacuations, and by the symptoms detected on a careful examination of the abdomen. — It is not improbable that the pancreatic secretion becomes disordered, particularly in protracted cases; but of this sufficient proofs are seldom furnished: at best it can be only a probable inference. That this secretion may be diminished is not unlikely, inasmuch as there is sufficient evidence of the *biliary secretion* being deficient, retained, and altered, especially in the chronic states of indigestion; and it is reasonable to infer, that, when one of the organs deriving influence from the same part of the nervous system is impaired in its functions, the other organs thus associated, as well as otherwise anatomically connected, will be similarly, if not coordinately, affected. Indeed, every experienced practitioner must have noticed a more or less remarkable deficiency, or other disorder of the bile in dyspepsia; and not only of it, but also of the other secretions poured into the intestinal canal. That the disorder originally induced in the stomach, often extends to the other digestive organs, owing to various concomitant or consecutive circumstances, cannot be doubted. It may be even apprehended, that the consecutive disorder will become the most serious in its nature and consequences, when these circumstances are frequent or continued in their operation; and that it will thereby obscure or mask the original affection. In many cases of dyspepsia, the functions of the biliary apparatus are impaired, in respect, not only of the quantity, but also of the qualities or properties of the secretion. In some, more or less of retention or obstruction of bile actually takes place, as shown by the state of the stools, rather than by the colour of the surface of the body. The remora of bile, also, in the biliary ducts and gall bladder, arising from impaired function of the stomach and torpor of the liver, will further increase the morbid state of the evacuations.

20. *D. Sympathetic affections of various organs.* — Whilst an immense number of diseases originate in neglected or protracted indigestion, various disorders are entirely sympathetic of it. Diseases of the urinary organs, of the liver and bowels, gout, rheumatism, various painful, neuralgic, and nervous affections, eruptions on the skin, disorders of the catamenia, and many others, often thus arise. Dr. Webster, in a treatise published in 1793, endeavoured to show this, before the appearance of the writings of Mr. Abernethy on the subject; but it had not been altogether neglected in the works of Whytt and others. This excellent author very justly remarks, that a delicate state of the first passages, or an unnatural sensibility of their nerves, not only disposes to many complaints in those parts, but the whole nervous system is thereby rendered more liable to be affected by the slightest causes. "Faintings, tremors, palpitations of the heart, convulsive motions, and great fearfulness, may be often owing more to the infirm state of the first passages, than to any fault either in the brain or heart. The powers which the alimentary canal, when its nerves are disagreeably affected, must have in producing disorders in the most distant parts of the body, cannot be doubted by those who attend to that wonderful and widely-extended sympathy, which obtains between it and almost the whole system."

21. *a.* The brain and organs of sense are often much affected by indigestion. *Headach* is one of the most common and severe affections, sympathetically excited by this complaint; but it has received sufficient consideration in the article on its different forms. The manifestations of *mind*, both intellectual and moral, are also often more or less disordered, although but slightly or imperceptibly. Memory is somewhat impaired; attention is unsteady and cannot be long continued; the disposition is more fickle, and the temper more irritable than natural. There are often confusion of thought, or of ideas, lowness of spirits, despondency, and vertigo, particularly in severe or protracted cases. M. Broussais has argued with much apparent justice, that the functional disorder, thus sympathetically induced in the brain, may, by its frequency or continuance, pass into organic change; and several recent writers in this country have adopted the opinion.

22. *b.* The *organs of sense* are not less liable to sympathetic disorder. — The *sight* becomes weak and indistinct; the eyes impatient of light or irritable; and specks or muscæ volitantes appear in the

axis of vision. — *Hearing* is frequently impaired, often from weakness of the nerves; but sometimes in consequence of the erythematic redness and inflammatory irritation, symptomatically produced in the throat, having extended along the Eustachian tube to the internal ear; or having caused obstruction of this canal. Noises in the ear are usually present in these cases; and these, as well as the hearing, depend much upon, and vary with, the state of the stomach. Care should be taken, however, not to impute affections of the head and of the senses, depending upon disease within the cranium, to disorder of the digestive organs. The disorders of these parts, arising from the stomach and other digestive viscera, disappear or are mitigated by wholesome food and drink, taken in moderate quantity; but when they proceed from the brain, they are aggravated, or at least, not mitigated, by the usual ingesta.

23. *c.* In the article FLATULENCE, I have shown the effect produced upon the actions of the *heart* by this, and other causes of distention of the digestive tube. Palpitations, and irregularity and intermissions of the pulse very often proceed from dyspepsia, particularly when the functions of the liver and of the intestinal canal are also disordered. In such cases, the morbid sounds of the heart are usually wanting, unless in some cases of severe palpitation, when a slight bellows sound is heard. The functional disorder, when frequent or protracted, may be followed by dilatation or some other organic change. When structural lesion already exists in this organ, the symptoms are much increased by indigestion, and by concomitant disorder of the liver. It should, however, be recollected, that lesions of the heart often occasion congestions of the liver and dyspeptic affections; and always aggravate them, where they already exist.

24. *d.* The influence of dyspeptic complaints in producing *affections of the lungs,* was contended for by Dr. W. PHILIP, doubted by Dr. PARIS, but admitted, in a limited sense, by Dr. J. JOHNSON, and some others. The choice Dr. PHILIP made of the term "*dyspeptic phthisis,*" was certainly not fortunate, inasmuch as its meaning is equivocal. In protracted dyspepsia, and particularly when the liver becomes congested, or otherwise disordered, the respiratory organs often also are affected; the disorder of the digestive viscera both predisposing to affections of the respiratory passages, and occasionally more directly causing them. The irritation excited in the œsophagus, pharynx, and top of the larynx, by the affection of the stomach, is sometimes propagated along the air passages; and if, at the same time, the stomach is frequently distended and the liver congested, so as to impede the circulation through the lungs, disease of this latter probably will often be induced, especially if latent tubercles, or some other states of predisposition, exist. Besides, the debility caused by protracted disorder of the digestive organs often calls latent tubercles into activity, or rapidly developes them; and it may even be suspected that the impaired nutrition, consequent upon the debility and protracted disorder of the organs of supply, will sometimes even give rise to tubercular productions, where they did not previously exist even in a rudimental state.

26. iv. THE CONSEQUENCES AND TERMINATIONS OF INDIGESTION have been partially alluded to (§ 19, 20.); but they require a more particular notice. (*a*) Dyspepsia may terminate in a restoration of the healthy function of digestion; — (*b*) It may pass into more severe functional or structural disease of the stomach; — (*c*) It may superinduce disease of the liver, bowels, and other collatitious organs; — (*d*) It may give rise to affections of remote organs or parts; — (*e*) and lastly, it may alter the constitution of the circulating fluids, originate diseased secretions and depositions, and generate a morbid diathesis of the system, occasioning several serious consitutional maladies. These consequences will, however, depend much on the exciting causes, the predisposition, the temperament, the habit of body, and other circumstances proper to the person affected.

27. *a.* A termination in restoration of healthy digestion seldom takes place, or if it take place, it is rarely permanent, unless the predisposing and exciting causes are avoided. Many of those causes originate in those propensities, desires, and passions, which are controlled with the greatest difficulty; and several of them depend upon habits, which require the utmost force of character to relinquish. Hence the want of success so often experienced in the treatment of dyspeptic complaints, and the dissatisfaction evinced by those who run from one physician to another, unreasonably expecting immediate or permanent relief, still desiring to indulge the senses — to gratify the propensities and desires, natural or acquired, without paying the penalties thereby incurred. Hence, also, the frequency of the serious consequences of severe or neglected dyspepsia about to be noticed.

28. *b.* The forms of indigestion already described, from neglect or the continuance of their causes, may pass into the more severe affections of the stomach. In some instances, the most violent *gastrodynia* or gastralgia supervenes on them. (See STOMACH — *Painful Affections of.*) In others, PYROSIS follows the form of irritative dyspepsia attended by the rejection of a glairy fluid, (§ 13.) and seems to be an extreme condition of the same complaintwith modifications depending upon peculiarities of constitution and of functional lesion. In some cases, VOMITING (see that article) of a severer or more prolonged character than that occasionally taking place in dyspepsia, occurs, even independently, although more frequently in consequence, of structural change of either the stomach or some other organ. In the latter case, the source of mischief may be in the liver, or in the brain, or even in the kidneys, or uterus. More rarely neglected cardialgia or other dyspeptic states pass into partial or complete RUMINATION, (see that article), particularly when the meals are taken hurriedly, in large quantity, and insufficiently masticated (see AUTHOR, in *Lond. Med. and Phys. Journ.* for May, 1821, p. 362.). Neglected dyspepsia is very frequently followed by inflammatory action, and its consequences in the villous coat of the stomach (see STOMACH — *Inflammation and Organic Lesion of*). This result, I am convinced would more frequently take place, and when it did occur, would lead to still more serious effects, but for the circumstance of the secretions from the villous coat favouring resolution by unloading the capillary vessels, and for the want of appetite and nausea attending inflammatory action, preventing the ingestion of substances calculated to keep up the morbid action.

28. *c.* The supervention of disease, functional or structural, in collatitious viscera, in the course even of the more simple and slight forms of indigestion, is so common, that the attention should never be withdrawn from it in practice. There are few cases of dyspepsia, in which the functions of the Liver and Duodenum (see those articles) are not more or less disturbed. The *liver* becomes torpid and congested, and sometimes more or less tumid, from either congestion in its vessels, or accumulations of bile in the ducts; this secretion being often inspissated from absorption, during its remora, of its more watery part. It then either obstructs, irritates, or otherwise disorders the canals along which it passes (see art. Gall Bladder and Ducts), and affects even the substance of the liver itself, which ultimately becomes inflamed, and gradually and variously changed. In protracted or severe cases of indigestion, other organs also become disordered, especially the bowels; *constipation*, *colic*, or *diarrhœa*, in some one or other of their forms, frequently occurring, particularly when irritation of the digestive mucous surface is induced, and when the secretions, poured into the intestines, are deranged.

29. *d.* Affections of remote organs, sympathetically produced by dyspepsia, have been already noticed (§ 20.), but there are others which arise from this complaint, rather by a succession of morbid changes, than by any sympathy or consent of parts. When protracted or severe indigestion gives rise to an imperfectly elaborated chyle; or when the impaired organic nervous energy, which is chiefly manifested in the functions of the stomach in dyspepsia, extends also to the circulating, assimilating, and excreting organs; affections of the kidneys, and urinary bladder, in connection with a morbid state of the urinary secretion, frequently take place. Hence the formation of sabulous matter or gravel in the urine, and of calculi in the kidneys and bladder; and even the production of diabetes, and of slighter disorders of the excretion of urine, In females, dyspepsia not unfrequently occasions difficult, too frequent, or delayed or irregular menstruation, hysteria, and painful affections of the spinal nerves in some portions or other of their distribution, with tenderness in the dorsal spine. In both sexes, cutaneous eruptions either originate in, or are perpetuated by, dyspeptic disorders, and by the state of the circulating fluids, and of the cutaneous exhalation consequent upon them. A due recognition and estimation of these connections of disorder are of the utmost importance in practice.

30. *e.* There is every reason to infer, that the pathological conditions, of which dyspepsia is an early and important indication, by altering the functions of assimilation and secretion, and weakening the processes of depuration, may give rise to a state of the circulation, productive of painful affections, or of unnatural formations and depositions in weak or predisposed parts; or in other words, to a truly morbid diathesis, or constitutional derangement. Hence the frequency of rheumatism, of neuralgic or painful affections, of urinary calculi and gravel, and especially of gout, after protracted or severe indigestion.

31. II. Causes.—*A. Predisposing.*—Indigestion, although not confined to any period of life, occurs most commonly between the ages of twenty and forty-five; and in *its simple form* more frequently in the female, than in the male sex. The upper classes of society and the middle ranks of life are most subject to this variety of the complaint. It is more prevalent in cold and temperate, than in warm climates, and in the winter than in the summer; but whatever may be the temperature of the climate or of the season, damp weather, and a moist atmosphere, may be regarded as among its most active predisposing causes. The predisposition to this disorder is sometimes hereditary, particularly in persons of a weak relaxed fibre, with high nervous susceptibility, and general debility of constitution. Those in whom the functions of the stomach are naturally weak and feebly performed, the circulation languid, the temperature of the extremities below the natural standard, and the secretions generally disordered, or more abundant than usual, are also constitutionally predisposed to dyspepsia. Sedentary occupations, especially when carried on in close rooms and factories, indolent habits either of body or mind, long and intense study, insufficient exercise in the open air, addiction to debilitating excesses and injurious indulgences, luxurious modes of living, indulgence in sleep or in bed, breathing impure air and confinement to close or ill-ventilated apartments, remarkably predispose to this complaint. In persons thus predisposed, the slightest excess or irregularity, or the most trivial exciting cause, is often sufficient to bring on an attack of indigestion; whilst a repetition of such causes, or long exposure to their action, in those of a stronger habit and more vigorous constitution, cannot fail to have a similar effect.

32. *B. The exciting causes* are divisible into two classes: — (*a*) Those which operate immediately or directly upon the stomach itself; and (*b*) Those which influence this organ through the medium of other parts. — (*a*) The causes, which affect the stomach itself, act either by diminishing or otherwise vitiating its secretions, so that the due change is no longer effected in the food; or by debilitating its muscular power, so that the aliment, although it may have been properly acted upon by the gastric juice, is not propelled into the duodenum with the natural ease and rapidity. As the admixture of the food with the gastric juice, and the passage of the chyme into the duodenum can only be accomplished by the due contraction of the muscular fibres of the stomach, it is evident that, whatever tends to weaken or to impede this action, will at once be followed by oppression or distention of the organ. In this class of agents may be included narcotics, taken habitually or in excess, as opium, henbane, conium, digitalis, &c., indulgence in ardent spirits, or intoxicating liquors, and the constant or frequent use of the preparations of ammonia, of lavender, and of other aromatic spirits. But the most common causes of indigestion are, irregularity and want of due caution in diet, whether as regards the quantity, or the quality and congruity of the food, or the periods at which it is taken, and the use of tobacco in any of the modes in which this noxious substance is so generally employed.

33. A want of due relation between the state and powers of the digestive organs, and the substances upon which they are required to exercise their functions, is a very frequent cause of this complaint; for whether the stomach be distended by

an unusual quantity of food; or whether its secretion be compelled to act upon substances which are inappropriate, or to which it is unaccustomed, the function of the organ will be equally impeded; and if the exciting cause be powerful, or continue in operation, digestion will be altogether suspended. Hard and indigestible articles of food must therefore be productive of this disorder; and hence its frequency among the peasantry and lower orders. Heating and highly-seasoned articles of food, hot dishes, and condiments, mushrooms, shell-fish, melons, cucumbers, nuts, and similar substances; raw, stale, or unripe fruit; rich articles of confectionary; acid, iced, or sweet fluids, especially when taken during the process of digestion; large quantities of cold or of warm fluids, as of tea, relaxing slops, &c.; and the habitual use of malt liquor, are among the most common causes of indigestion. The kind of aliment also exerts no small influence, even in mechanically distending, and thereby weakening the stomach; for as most of the articles of food, when received into the organ, seem to swell in a greater or less degree, a bulky meal, particularly of solid or pultaceous or vegetable substances, will not a little contribute to this effect. To the above causes may be added, irregularity in the period between the times of taking food, hasty or imperfect mastication, frequent interruption or talking during the progress of eating, the omission of an accustomed meal, abstinence or long fasting,—hence its frequent occurrence during the fasts of the Catholic church, and among the Brahmins, Fakirs, &c., in India,— a sudden change in diet from animal to vegetable food, and from substances of a succulent and refreshing, to those of a dry and heating nature, and severe and repeated vomiting. All these tend, in a greater or less degree, to debilitate the muscular fibres of the stomach; to produce a deficiency of gastric secretion, or a secretion vitiated in its properties; and to irritate the villous coat of the organ.

34. *b.* Amongst those causes which operate on the stomach through the medium of other parts, may be classed those mental emotions, which depress nervous power, or otherwise disorder its manifestations. A due secretion of the gastric fluid depends much on the state of nervous influence; for a deficiency of the latter impedes or lessens the former. Any sudden intelligence, a violent fit of passion, or of great joy, sometimes instantly brings on an attack of indigestion. Grief, anxiety, envy, jealousy, indulgence in tender feelings, repeated disappointment, reverses of fortune, night watching, &c., more slowly, but more certainly, exert a similar influence. Whatever exhausts the body and lowers the constitutional powers, exerts a correlative effect on the digestive functions, as venesections improperly adopted, or soon after a meal; protracted hæmorrhages; menorrhagia; leucorrhea; venereal excesses; seminal weakness; and exhausting discharges of any kind. In persons particularly of a weak and delicate constitution, indigestion is easily induced by change of weather, by exposure to the night air or to cold and humidity, by cold extremities, by a low temperature when the body is quiescent, as when travelling in an open carriage or on the outside of stages, by a fatiguing journey, by damp residences, and similar circumstances. Whatever exerts a depressing effect on the organic nervous power, or on any of the internal viscera, will also lower the function of the stomach, as large doses of calomel, or too long a continuance of this medicine, irritating and drastic purgatives, &c. Dyspepsia may be brought on, also, by the suppression of the natural and the accustomed discharges, or by the retropulsion of cutaneous eruptions, &c. It also not unfrequently accompanies catarrhs, rheumatism, and diseases of the thoracic viscera; it is a necessary consequence of disorder of any other of the abdominal organs; and it precedes and attends the various states of gout, &c.

35. *C. The irritative states of dyspepsia* are more frequently met with in the male than in the female sex, and are very prevalent in the southern countries of Europe, and amongst Europeans resident in tropical regions. They are common in those warm climates in which the air is dry, and the temperature subject to frequent and sudden variations; but the causes acting directly on the stomach are often frequent and influential in those countries. In warm climates, the modes of living — the diet and regimen of Europeans are extremely prejudicial to the digestive functions, as shown by Mr. Annesley, and the Author. (*Researches on the Diseases of India and of Warm Climates, generally, &c.*, 4to. vol. i. p. 226.) The quantity and nature of the food and drink usually taken excite and irritate the stomach, liver, and intestinal canal, and exhaust their functions; the states of indigestion thus induced soon passing into inflammation, or into organic changes, if neglected or injudiciously treated.

36. The irritative states of dyspepsia are, however, by no means uncommon in this country, in hot seasons, and even in very cold weather, and during the prevalence of severe or long continued frosts, accompanied by north-easterly winds. They affect chiefly persons of a sanguine and bilious temperament, and of plethoric habit; and in them, especially, are sometimes produced by checked perspiration, by the suppression of accustomed discharges, as of hæmorrhoids, of leucorrhea, of the catamenia, &c., by the drying up of ulcers, and by the repulsion of cutaneous eruptions. They are, however, more commonly occasioned by the abuse of stimulants, as highly-seasoned and rich food, and by addiction to spirituous and intoxicating liquors, and to opium. These states of indigestion are not so often consequent upon errors in diet, as the other forms of the complaint; but they are most frequently met with in the habitual drunkard. They may be induced by change of diet, or change of residence, or climate, and hence their greater prevalence during spring and autumn; by stimulating medicines, as a long continuance of the use of cubebs and copaiba for gonorrhea; by drastic and irritating purgatives; by powerful or repeated emetics; by tonic, stomachic, and aromatic spirits or tinctures, taken in too large doses, or on improper occasions; by hot spices and pickles, particularly cayenne pepper, capsicums, &c.; by the frequent use of mercurial and of heating medicines; by drinking cold and acid fluids after violent exercise, or whilst the body is perspiring; and by various noxious articles, used either as food or drink, or which give rise to incongruous mixtures in the stomach.

37. III. Pathology. — Indigestion manifestly proceeds from the following *conditions* of the sto-

mach and related organs, either of which may be somewhat more prominent than the rest: — 1. Impaired organic nervous power of the stomach. 2. A deficient or disordered state of the gastric juice, or a want of a due relation between the quantity and nature of this fluid and the ingesta. 3. Impaired absorbing power of the stomach, rendering the digestion of the fluid ingesta more or less difficult, and weakening the gastric fluid. 4. Diminished muscular energy of the stomach; the motions and tonic vermicular actions of the organ being weakened, and the admixture of the gastric juice with the ingesta being thereby impeded or delayed.* These pathological conditions may be *primary*, or they may be *consecutive* upon disease of the brain, of

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* As Dr. Combe observes, the *first* requisite to digestion is an adequate supply of gastric juice, and its thorough admixture with every particle of the food on which it is to operate. The *second* is a steady temperature of about 98° or 100° Fahr. The *third* is the gentle and continued agitation of the alimentary mass in the stomach during the digestive process. — Much light has been thrown upon the function of digestion, and consequently upon disorders of this function, by the experiments of Dr. Beaumont, of America, on St. Martin, a strong young Canadian, who was wounded in the left side, a fistulous opening into the stomach remaining without detriment to the general health. For some months after the wound, the food could be retained only by wearing a compress and bandage; but early in winter, a small fold or doubling of the villous coat began to appear, which gradually increased till it filled the aperture and acted as a *valve*, so as completely to prevent any efflux from within, but to admit of being easily pushed back by the finger from without.

Dr. Beaumont describes the aperture in St. Martin's stomach as being situated about three inches to the left of the cardia, near the left or superior termination of the great curvature. When the stomach was nearly empty, he was able to examine its cavity, to the depth of five or six inches by artificial distention. When it was entirely empty, the stomach was always contracted on itself, and the valve generally forced through the orifice, together with a portion of the mucous membrane, equal in bulk to a hen's egg. After sleeping for a few hours on the left side, the protruded portion became so much larger, as to spread over the neigbouring integuments five or six inches in circumference, fairly exhibiting the natural rugæ, villous membrane, and mucous coat, lining the gastric cavity. This appearance was almost invariably exhibited in the morning before rising in bed.

The first point which Dr. Beaumont conclusively settled is, that the gastric juice does not continue to be secreted between the intervals of digestion, and does not accumulate, to be ready for acting upon the next meal. The next which he established is that in health, the gastric secretion always bears a direct relation to the quantity of aliment naturally required by the system; so that if more than this be taken, there will be too small a supply of the juice for the digestion of the whole. Dr. Beaumont further ascertained that the gastric secretion, and the villous coat, undergo great changes during disease. In the course of his attendance on St. Martin, he had opportunities of *seeing* what was actually going on in the organ, and of observing, that whenever a feverish state was induced by obstructed perspiration, or by stimulating liquors, or by overloading the stomach; and that when influenced by fear, anger, or other emotions, depressing or disturbing the nervous system, the villous coat became sometimes red and dry, and at others, pale and moist, having lost its smooth and healthy appearance. As a necessary consequence, the secretions became vitiated, impaired, or suppressed; and the follicles, secreting the mucus which protects the surface of the villous coat, became flaccid, and no longer yielded this bland secretion. The nervous and vascular papillæ thus deprived of their defensive shield were then subjected to undue irritation. When these diseased appearances were considerable, the system sympathised, and dryness of the mouth, thirst, quickened pulse, &c., showed themselves; and no gastric juice could be procured or extracted, even on the application of the usual stimulus of food. The dry, irritated appearance of the villous coat, and the absence of the healthy gastric secretion in the febrile state, as Dr. Combe has remarked, not only explain at once the want of appetite, nausea, and uneasiness generally felt in the region of the stomach; but also show the folly of attempting to sustain strength, by forcing the patient to eat, when the food cannot be digested, and when nature instinctively refuses to receive it.

The inferences, drawn from the experiments and observations of Dr. Beaumont and others, that more immediately concern the subject under consideration, may be stated as follows: —

1. That the processes of *mastication*, *insalivation* and *deglutition* are important, not merely as subjecting the food to the gastric juice in a state of due preparation for its action, but also as allowing time for the regular contraction of the stomach upon each individual morsel conveyed into it, as well as transmitting the food in small portions at a time, so as to prevent a too rapid or excessive, and injurious distention of the organ.—

2. That the gastric juice is the agent of chymifaction; that it is secreted from vessels distinct from the mucous follicles; that it is a clear transparent fluid, without odour, a little salt, and perceptibly acid; and that it contains free hydrochloric acid, a little acetic acid, and some other active chemical principles. —

3. That this juice is never found free in the stomach, but is always excited to discharge itself by food or other irritants; that it is seldom obtained pure, but generally mixed with mucus, and sometimes with saliva; and that, when pure, it is capable of being kept for months, or even years. —

4. That it is a solvent of food, and alters its properties; that it checks the progress of putrefaction, corrects putrid substances, coagulates albumen and milk, and afterwards dissolves the coagula; and that it commences its action on food as soon as it comes in contact with it. —

5. That it is capable of combining with a certain fixed *quantity* of food; and when more is presented for its action than it will dissolve, indigestion will ensue; and that its action is facilitated by the warmth and motions of the stomach, these motions taking place chiefly in two directions, transversely and longitudinally. —

6. That the gastric juice is modified in quantity, and probably in its intimate constitution, so as to suit the kind of food; and hence the occurrence of indigestion on sudden alterations of the kinds, quality, and quantity of food.

7. That the action of the stomach and of its fluids is the same on all kinds of diet: and that the motions of the stomach produce a constant admixture of food and gastric juice, and thereby facilitate digestion. —

8. That *solid* food, of a certain texture, is easier of digestion than *fluid*; that *animal* and *farinaceous* aliments are more digestable than *vegetable*; but that susceptibility of digestion does not depend altogether upon natural or chemical distinctions. —

9. That digestion is facilitated by *minuteness of division* and *tenderness of fibre*, and retarded by opposite qualities. —

10. That the ultimate principles of aliment are always the same, from whatever food they may be obtained. —

11. That chyme is homogeneous, but variable in its colour and consistence; and that, towards the latter stages of chymification, it becomes more acid and stimulating, and passes more rapidly from the stomach. —

12. That soups and other liquid food do not call into play the muscular coat of the stomach; and before the gastric juice can act upon them, the fluid part must be absorbed and the mass thickened to a proper consistence for undergoing the usual churning motion; and, consequently that this kind of food often gives rise to acidity, particularly in weak states of the stomach. —

13. That, owing to the adaptation of the gastric juice to the nature of the food, sudden or extreme changes from one kind of diet to another is injurious; for the stomach has not had time to modify its secretions sufficiently to meet the altered demand upon its powers. —

14. That water, ardent spirits, and most other fluids, are not affected by the gastric juice, but pass from the stomach soon after they have been received; that heating condiments are injurious to the healthy stomach; and that the use of spirits always causes disease of this organ, if persevered in. —

15. That bulk, as well as nutriment, is necessary to articles of diet; and that digestibility does not depend upon the quantity of nutrient principles that aliments contain. —

16. That the quantity of food generally taken is more than the wants of the system require; and that such excess, if persevered in, generally produces functional disorder, and consecutively, organic disease. —

17. That oily food is difficult of digestion, though it contains a large proportion of nutrient principles.

18. That *bile* is not usually found in the stomach, and is not necessary for the digestion of food; but that, when oily food is used, it assists digestion. —

19. That gentle exercise facilitates digestion; and that the *acetic*, *citric*, and *hydrochloric* acids promote this process, particularly if vegetables and indigestible subsances have been taken. —

20. That the time required for the stomachic digestion

the liver, of the intestines, of the heart, of the kidneys, or of any other organ; or they may be part only of some more general malady. Dyspepsia may thus be *idiopathic* or *symptomatic*. As presented to the physician in practice, indigestion is generally owing to the above conditions, in connection with the following: — 1. Deficiency, as to quality and quantity, of the fluids derived from the liver, pancreas, and intestinal mucous membrane. 2. Disorder of the circulation and functions of this membrane; and 3. Disorder of the consecutive and harmonious actions of the muscular coat of the small and large intestines.

38. IV. TREATMENT. — There are few diseases which require greater attention to its causes, and to its various states during the treatment, than this. The *objects* of the practitioner are: — 1. To ascertain the predisposing and exciting causes; 2. To draw a rational inference as to the pathological states on which the complaint depends; and 3. To examine into its associations, and to attend to the nature and relation of its complications, whether primary or consecutive. Guided by these *general intentions*, the more *special indications* are: — 1. To avoid the causes; 2. To give immediate relief to the more urgent symptoms, as acidity, cardialgia, flatulence, pain, costiveness, &c.; 3. To remove the pathological states and their consequences; and 4. To prevent a return of the disorder. These indications require to be fulfilled by means appropriate to the particular form of the complaint.

39. i. *Treatment of the Asthenic Form of Dyspepsia. A. In the more acute states*, it is sometimes necessary to remove the load by which the stomach is oppressed, or the substance by which it is irritated, by an *emetic*. But, unless when it is obvious that the disorder depends upon this cause, emetics are injurious, particularly a repetition of them. In such circumstances, the effect is soon produced by irritating the fauces by a feather, or with the finger; by a warm infusion of chamomile flowers; by tepid water, with common salt, or with an aperient salt, and by ipecacuanha. When pallor of the countenance, nausea, oppression, and the sense of a load at the epigastrium, and rancid or bitter eructations are present, emetics are indicated; and these are the most suitable means. But after the organ is evacuated, its functions should be restored by repose, and by small quantities of seltzer water, of iced water, or a cooling aromatic water, as spearmint, &c. Food should not be given till the appetite returns, when the lighter and more palatable articles may be taken. The bowels afterwards require to be evacuated, either by stomachic aperients, as rhubarb, with magnesia or soda, in an aromatic water, or aloes with an alkali, as in the compound decoction, or by enemata. Most of the means recommended in the article CONSTIPATION (§ 15. *et seq.*), and in several of the Formulæ of the *Appendix*, will likewise be appropriate in these circumstances.

40. When *nausea* continues after the stomach and bowels have been evacuated, or when the *vomiting* is protracted after offending matters are removed, medicines to relieve these symptoms should be prescribed, especially the *hydrocyanic acid*, in camphor julep, with a little compound spirit of lavender, or tincture of cardamoms, or a drop or two of *kreosote*, in the form of a pill, with powdered liquorice root. Effervescing draughts, with citric acid and ammonia, this last being somewhat in excess; or the liquor ammoniæ acetatis, with camphor mixture, or with spearmint water; or calcined magnesia, in this or in any other aromatic water, will also be serviceable. If these fail of affording relief, active purgative enemata will generally be efficacious, the symptoms disappearing as soon as a free action of the bowels is procured.

41. *Heartburn* is best treated by medicines, which act upon the secretions, and move the bowels. Rhubarb, with magnesia, and sesqui-carbonate of ammonia, in an aromatic water; blue pill, with castile soap; and alkaline solutions in bitter tonic infusions, or in lime water, are commonly employed, and are most useful when this symptom is connected with acidity. But when heartburn is attended by rancid, septic, or insipid eructations, the mineral acids, as the nitric, the hydrochloric, and the aromatic sulphuric acids, given in simple camphor, or aromatic water, or in suitable tonic infusions, will be most serviceable. Dr. PEMBERTON advises lemon-juice in these cases, and Dr. TODD, the phosphoric acid. When there is a liability to heartburn, wine, spirits, and particularly malt liquors, should be avoided. Hock or old sherry may, however, be taken in great moderation, in seltzer water.

42. *Pain*, or the slighter states of morbid sensibility, will be best removed by the *trisnitrate of bismuth*, conjoined with extract of *hop*, or extract of *hyoscyamus*; by *hydrocyanic acid* or *kreosote*, as directed above (§. 40.); by other anodynes, given with aromatics and antispasmodics; by the compound or fœtid spirit of ammonia, in suitable vehicles; by the compound galbanum pill, or the compound rhubarb pill, with henbane and ipecacuanha; by draughts of warm water, either alone, or with an alkali, or with magnesia. If pain be severe, and if *vomiting* have come on spontaneously, and continued after morbid matters are removed, a full dose of *opium*, with an aromatic, or of the acetate or hydrochlorate of morphia, similarly combined, should be prescribed. But the propriety and frequency of repeating it will depend upon the circumstances of the case. If *fla-*

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depends upon the quantity and kind of food, and upon the state of the stomach; that the time required for the disposal of a moderate meal, in a healthy state of the organ, varies from three hours to three hours and a half or four hours; and that in states of indigestion, the process is delayed much longer than this, particularly as respects the more indigestible substances. —

21. That a diminution of the temperature of the stomach below 98° impedes digestion: and that the temperature of the organ is not necessarily elevated by the process. —

22. That whatever promotes organic nervous power, without exhausting it, favours digestion, as breathing a dry pure air, hilarity of mind, moderate laughter, &c. —

23. That the organic or ganglial nervous influence is more concerned in the process of digestion, than the influence conveyed to the stomach by the eighth pair of nerves; and that the circulating, absorbing, and especially the secreting functions of the organ are under the dominion of the former, whilst the sensibility and muscular contractions are directed by the latter. —

24. That the inference drawn by Dr. W. PHILIP from his experiments, as to digestion depending upon the influence of the eighth pair of nerves, and as to galvanism being capable of supplying the place of this influence, are unphilosophical, as they are formed without due consideration of all the circumstances, and as they leave out of the account the shock given to the system by the violent operations performed in these experiments.

tulence is troublesome, the means already advised may be prescribed, or those recommended in that article (§ 15.) may be employed. Friction over the epigastrium, especially with a stimulating liniment, will also give immediate relief from both pain and flatulence. When *headach* is present, the treatment proposed for *Dyspeptic* Headach (§ 46.) should be directed. For the *costiveness* so generally attendant upon this form of indigestion, the medicines already noticed, or those about to be prescribed, or a combination of mild aperients with tonics, deobstruents and alteratives being given occasionally at night, will prove of great service.

43. After an acute attack of dyspepsia, particularly when occasioned by errors of diet, it is necessary to enjoin abstinence, and thus afford the stomach time for repose, until its organic sensibility and functions begin to return. After a while, a cup-full of mutton or veal broth, or of green tea, or of coffee without milk, may be given and repeated; or a wine-glass full of port-wine negus may, in some cases, be allowed. But care should be taken in returning to a full diet; and the injunctions as to diet about to be stated ought to receive attention. In general, tonics and stomachics should not be prescribed until the functions of the stomach are returning.

44. *B.* Having removed the more acute attack of asthenic dyspepsia, with its urgent symptoms, the remaining disorder is in all respects the same as the more *slight and chronic states of the complaint*, and requires a similar treatment to them. The *third intention* of cure (§ 38.) should now be carried into effect; and the organic nervous energy, the secretions, and the muscular tone of the stomach be improved. This intention is to be effected chiefly by the *diet* and *regimen* hereafter to be noticed; but a judicious recourse to medicine will also prove of great benefit. The infusion of cinchona, of columba, of gentian, chamomile, cusparia, cascarilla, will be severally useful, with the alkaline carbonates, and small doses of stomachic tinctures. Afterwards the metallic tonics, as the tincture of the sesquichloride of iron, the sulphate of iron, the sulphate of zinc, the trisnitrate of bismuth, and the mineral acids, will generally be of service. Several of these may be given with the extract or tincture of hop, or of hyoscyamus. Lime water may be taken with aromatics, particularly when the bowels are much relaxed; and the aërated, or alkaline chalybeate waters may be used. When there is no complication contra-indicating cold bathing or the shower bath, it will be advantageous to resort to them frequently; and when uneasiness at the epigastrium is often felt, a warm plaster will be worn in this situation with benefit.

45. The most active or varied means employed to restore the functions of the stomach will be frequently inefficacious, if the offices of the collatitious viscera be imperfectly performed. The *biliary secretion* should therefore be promoted or corrected by occasional doses of blue pill, or Plummer's pill with soap: and the bowels preserved moderately open by mild purgatives, or by a combination of them with bitters and tonics. With this view, rhubarb may be conjoined with aloes, guaiacum, and ipecacuanha, or with magnesia; the infusion of senna, with the infusion of gentian; the compound decoction of aloes, with the decoction or extract of taraxacum; the sulphate of potash with rhubarb; the purified extract of aloes with castile soap, &c. — These and other mild purgatives may be taken in other combinations, as draughts, mixtures, or pills, as prescribed in numerous and various forms in the *Appendix*, and in the article Constipation. A judicious combination of bitters with mild purgatives, as, of sulphate of quinine, or inspissated oxgall with aloes (F. 562. 575.); the infusion of senna with any of the bitter infusions (F. 266.); and the decoction of aloes, with soda and infusion of columba, will generally be extremely useful in this state of the complaint.

46. When chronic asthenic dyspepsia is attended, not only by a torpid state of the liver, but also by incipient cachexia, or has given rise to cutaneous eruptions, &c., much benefit will result from the simple preparations of sarza, with liquor potassæ or Brandish's alkaline solution, and extract of taraxacum. If it have occasioned difficult or impaired menstruation, or a state of incipient chlorosis, as often observed in females in London, the preparations of iron, particularly the mistura ferri composita, the decoction of aloes being taken so as to act freely on the bowels; or the pilula ferri composita, conjoined either with the pil. aloes cum myrrha, or the pil. aloes composita; will generally remove all disorder, if sufficiently persisted in, and aided by change of air, diet, and exercise.

47. In this form of dyspepsia, the restoration of the digestive functions much depends upon a healthy state of the other excreting organs, as well as of the bowels. The functions of the kidneys and of the skin should be duly promoted and corrected. The temperature of the general surface, and the exhalations from it, ought to be preserved, and the urine duly examined, in order to ascertain, not only its appearance, but the general character of its chemical constituents. As these vary, or, as certain of them predominate, so should some of the most efficacious medicines, prescribed in the complaint, be varied or altogether changed; so should tonics be conjoined with alkalies or acids; and aperients and alteratives be given with absorbents or deobstruents.

48. ii. *The irritative variety of dyspepsia* requires very different means of cure from those just advised; but the removal of the exciting causes is as necessary in the treatment of it as in that of the foregoing. — *a.* In the more *acute states* of this variety, when pain, tenderness, heat, or soreness is felt in the epigastrium, although the vascular disorder of the villous surface may not amount, it nearly approaches to inflammation; and erethism, or vascular congestion, at least, exists. The application of *leeches* to the epigastrium then becomes necessary. In plethoric persons, a *bleeding* from the arm should be preferred. In those who have suffered from hœmorrhoids, or obstructions of the liver, *cupping* on the hypochondria, and in females, whose catamenia are deficient, leeches to the groins may be prescribed. Afterwards a large rubefacient plaster, formed either of equal parts of the compound pitch and ammoniacal plasters, or of seven parts of the former with one of the cantharides plaster, should be applied over the epigastrium. The blue pill, or hydrarg. cum cretâ should be taken at bed-time, and a mild aperient in the morning. Fresh castor oil,

assisted by cathartic enemata, will be useful in this variety. In some of the more acute cases, a full dose of calomel, either alone, or with a little James's powder, will be of service. Although calomel, when frequently exhibited, weakens the nervous energy, yet an occasional dose diminishes vascular action in the villous coat of the stomach, and excites the actions of the lower bowels. It should be followed by mild purgatives and active enemata; for by increasing the organic actions of the lower portion, the morbid states of the upper parts of the digestive tube, will the more readily subside. When this variety of dyspepsia is attended by an erythematic *redness*, or *soreness of the fauces and pharynx*, as it frequently is, sometimes extending down along the œsophagus, calomel, taken in the form of powder, aided by mild aperients and active enemata, will be of essential service, not only in acting in the manner just stated, but also in promoting the secretions of the liver and intestinal canal.

49. The other *urgent symptoms*, noticed with reference to the former variety, are generally much more severe in this, and require a somewhat modified treatment. But irritation, erethism, congestion, or even inflammatory action of the villous coat, are not the only pathological states characterising cases of this kind. Organic nervous power, the secretion of the gastric juices, and the tone of the coats of the stomach, are more or less weakened or disordered, and require to be strengthened, as well as corrected. At first, cooling medicines and diaphoretics are required, in order to remove irritation or vascular excitement; but they should afterwards be conjoined with mild tonics or gentle restoratives, and aided by a light farinaceous diet (§ 72.). If *nausea* or *vomiting* occur in this variety, the means already prescribed (§ 40, 41.) will generally remove them. — If they proceed from irritating ingesta, the gentle measures noticed above (§ 39.) will procure their expulsion. Afterwards small doses of the nitrate of potash, and of the solution of the acetate of ammonia, may be taken in camphor water. — When this variety is caused by intemperance, these medicines, aided by abstinence, will prove particularly serviceable. If pain or internal heat is complained of, or if vomiting continues after offending matters are removed, or after vascular depletion has been practised, the warm turpentine epithem, or a mustard poultice, may be applied over the region of the stomach, or one of the liniments above referred to, may be used as an embrocation in the same situation. The anodynes advised for the asthenic variety may also be taken, and cathartic enemata administered, until the bowels are freely evacuated. The medicines already recommended for *heartburn*, and for other unpleasant symptoms, will also be appropriate, after having had recourse to the means just advised.

50. *b.* In the *chronic states* of irritative dyspepsia, local depletions are requisite, only when there is evidence of plethora, or of increased action, or when natural secretions or accustomed evacuations are suppressed. Small doses of mild mercurials at bedtime, the simple preparations of sarza, either alone or with liquor potassæ, and external derivatives, are here extremely beneficial. After the secretions have been improved by these, and the excreting functions restored, the milder tonics conjoined with refrigerants and diaphoretics or anodynes, will be of great service. The decoction of Iceland moss and various other demulcents may be taken with hydrocyanic acid; and a plaster, consisting of either the ammoniacal, the compound pitch, or the compound galbanum plaster, may be worn on the epigastrium. I have generally preferred a plaster, consisting of equal parts of the compound pitch, and of the ammoniaco-mercurial plasters, and prescribed the following: —

No. 262. ℞ Potassæ Nitratis ʒ ss.; Liquor. Ammoniæ Acetatis ℥ i.; Infusi vel Decocti Cinchonæ ℥ iii.; M. Capiat Coch. ii. vel. iii. larga bis terve in die.

No. 263. ℞ Potassæ Nitratis ℈ i.; Liquoris Ammoniæ Acetatis ℥ i.; Aquæ Flor. et Infusi. Aurantii Comp. āā ℥ iiss.; Misce. Capiat tertiam partem, ter in die.

No. 264. ℞ Acidi Hydrocyanici, M. ii. Mist. Amygdalæ Dulcis; Aquæ Flor. Aurantii, et Mistur. Camphor. āā ʒ ss.; M. Fiat Haustus ter in die sumendus.

No. 265. ℞ Infusi Lupuli, ℥ ivss.; Acidi Hydrocyanici, M. viii.; Tinct. Aurantii et Tinct. Gentianæ comp., āā ʒ ii.; M. Capiat quartam partem bis terve in die.

No. 266. ℞ Liquoris Potassæ, ʒ iss.; Decocti Sarzæ. ℥ vii.; Extracti Sarzæ, ʒ iss.; Tinctur. Hyoscyami, ʒ i.; Tinct. Aurantii, ʒ iii.; Syrup. Sarzæ, ʒ ii.; M. Fiat Mistura, cujus capiat partem quartam ter quaterve in die.

No. 267. ℞ Infusi Valerianæ, ʒ x.; Acidi Hydrocyanici, ♏ ii.; Sodæ Carbonatis, gr. x.; Tinct. Cardamom. comp., ʒ i.; Spirit. Lavand. comp., ʒ ss; M. Fiat Haustus ter in die sumendus.

51. iii. *Treatment of the earlier consequences of dyspepsia.*—The treatment of several of these is fully discussed in the articles Duodenum, Flatulence, Headach, Hypochondriasis, Pyrosis, and Stomach — *Painful Affections of*. It will therefore be unnecessary to advance much under this head. — *a.* When dyspepsia, in either of its forms, causes frequent attacks of relaxation and soreness of the throat and fauces, or inflammatory redness of these parts with cough, the diet of the patient should be strictly regulated, and mild purgatives, aided by cathartic enemata, prescribed. These attacks should not be neglected in persons presenting any tendency to bronchitis, or to pectoral disease. Some of the severest states of laryngitis and tracheitis have originated in irritative dyspepsia, the symptomatic irritation of the pharynx and fauces extending to the larynx, and exposure to cold, to currents of air, or to other causes, heightening the affection of the respiratory passages. A predisposition to affections of the respiratory organs, or tubercles in a latent state, are then often called into activity by neglected dyspepsia, owing either to symptomatic irritation or to consequent debility. In females, excessive menstruation, as to either the frequency or quantity of the discharge, is often the more immediate consequence, or intervenes between the dyspeptic disorder and the pulmonary affection. In such cases, the treatment should be directed both to the original disorder, and to the consequent affections; and fortunately, much of the means, both medicinal and dietetical, is appropriate to both; the more astringent and refrigerant tonics, and mild or cooling aperients, benefiting the disorder of the stomach as well as the superinduced complaints. To these medicines, ipecacuanha, camphor, and narcotics, will be added with advantage.

52. *b.* The *symptomatic disorder of the heart*, consequent upon one or other of the varieties of dyspepsia, requires chiefly attention to the original complaint. When palpitation is frequent, or the pulse intermittent, after the bowels have been

reely evacuated, and the secretions improved, camphor and ipecacuanha with hyoscyamus, — the sulphate of iron with extract of hop,—the decoction of senega with orange-flower water, or infusion of orange peel, and hydrocyanic acid, — the infusion of valerian similarly combined,— the nitrate of silver triturated with the extract of henbane, or of hop, will severally afford relief. In the irritative states of dyspepsia, particularly if signs of congestion, erethism, or inflammatory irritation, of the villous coat be present, the treatment advised above for this state ought to be premised. At the same time, some one of the warm plasters already prescribed may be applied to the epigastrium. In 1820 I first employed the *nitrate of silver*, combined with narcotics, for a case of dyspeptic palpitation, commencing with half a grain thrice daily, and increasing the dose to one grain. This patient, and others similarly affected, for whom I have ordered this medicine, perfectly recovered. Dr. J. Johnson has strongly recommended the nitrate of silver in dyspepsia; and certainly few medicines are more deserving adoption, when the patient is not alarmed at its use. It should, however, be very cautiously employed. This writer also insists much upon the use of the *sulphate of quinine* in most dyspeptic cases. In small doses, with sulphuric acid, in infusion of roses, it is an excellent medicine at that stage of the treatment when active tonics should be prescribed, especially when much debility is complained of. In order to prevent its constipating effects, it may be given with small doses of the purified extract of aloes, or with the aloes and myrrh pill; and when palpitations and other nervous symptoms exist, camphor and hyoscyamus will be added to them with great benefit. In females who have long laboured under dyspepsia, the quinine taken in solution is very serviceable when the catamenia are too abundant; but in other circumstances, particularly when a *chlorotic* state of the system, and impaired or obstructed menstruation have supervened, the *sulphate of iron* with the aloetic preparations should be preferred.

53. *c.* Of all the consequences of protracted and irritative dyspepsia, *disorder of the biliary functions and disease of the liver*, are the most common. When evidence of congestion, or fulness, or tenderness in the region of the liver exists, then the treatment should be commenced with general or local depletions—with cupping on the hypochondrium, or near the right shoulder-blade, or with the application of a number of leeches near the epigastrium, or around the anus. Small doses of blue pill, or of calomel, ought to be taken occasionally at bedtime, and to be followed by saline aperients in the morning. Alterative medicines consisting chiefly of the alkaline carbonates, or of the liquor potassæ, should be given daily, with taraxacum, sarzæ, and such of the other remedies above recommended, as may be appropriate to the case; but the treatment of this complication is fully discussed in the articles Gall-bladder and Ducts, Jaundice and Liver.

54. *d. Cutaneous eruptions*, both acute and chronic, frequently are associated with the more protracted states of dyspepsia, and are often consequences of these states. Yet they are seldom referred to these sources, or to these conditions of the villous surface of the stomach, of the digestive mucous surface generally, and of the biliary and other excreting functions with which they are so intimately connected. In numerous instances, heating, stimulating, and irritating medicines are prescribed, either prematurely, or at a time or stage of the treatment of these eruptions, when local or general depletions, refrigerants, evacuants, alteratives, and a low cooling diet, ought to have been employed. This remark is applicable also to those early indications of biliary disorder, of affections of the kidneys and urinary bladder, and especially of gout, which so often appear in the course of chronic indigestion.

55. Of the Diet and Regimen in Dyspepsia. Unless the *diet* of the dyspeptic be duly regulated, medical means will be employed in vain. On the subject of diet with reference to indigestion, Dr. Paris, Dr. A. Combe, Dr. Robertson, Dr. Ticknor, Dr. T. J. Todd, and Mr. Mayo, have furnished much information of the best kind, and conveyed it in the most agreeable manner. It is impossible to adduce any thing on this topic which has not been already stated and illustrated by these able writers.—i. *In considering diet with reference to indigestion generally*, there are various circumstances requiring particular notice: 1st, The kinds and quality of the food; 2d, The quantity and congruity of the food; 3d, The times of eating, or the periods which should intervene between meals; 4th, The kind and quantity of drinks; and 5th, The conditions deserving notice in connection with eating and drinking.

56. *A. The kinds and quality of food.* — *a.* Dr. Combe justly remarks, that a direct relation ought always to subsist between the qualities of the food and the nature of the constitution which it is intended to support. The highly concentrated and stimulating food necessary for the support of those who take very active exercise will prove too exciting to the irritable constitution of persons possessed of great activity of the brain and nervous system; and the generous diet, which suffices to rouse or support a phlegmatic system, will prove too nutritive for a person of a florid and sanguine temperament. For persons of a florid complexion, with great activity of the circulation, and a consequent liability to inflammatory diseases, the food ought to be calculated to sooth rather than to stimulate. Red meat, spices, wines, and fermented liquors, ought to be used sparingly, and the principal support derived from soups, fish, mucilaginous vegetables, acidulous fruits, and diluting drinks. In lymphatic persons, on the other hand, where the circulation is weak and slow, and the functions feeble, benefit is derived from a larger proportion of animal food, while vegetables, soups, and fluids, prove relaxing. To these persons, wine in moderation and spices are useful, if much exercise be taken. Persons of a highly nervous temperament, of great excitability and sensibility to impressions, are injured by heating or stimulating diet. White meats, as fowl and fish, farinaceous and mucilaginous aliments, and ripe fruits, are most appropriate to them. Where the bilious temperament predominates, and much active exercise is taken in the open air, a full supply of animal food is necessary, and a moderate allowance of wine or other stimulus is borne with less detriment, if not with more advantage, than in the sanguine and nervous temperaments. Where the constitution is of a mixed nature, a diet composed of animal and

vegetable substances in nearly equal proportions is, under ordinary circumstances, the best. — The food, also, should be adapted to the age, state of health, and mode of life of the individual, and to the climate and season of the year. A diet which would be quite sufficient to a person of sedentary occupations, would be inadequate to support an individual subjected to frequent or constant exertion; and in warm climates and seasons, a smaller supply of food, particularly of a heating or stimulating kind, is necessary, than in cold and temperate countries. In the former but little animal food is requisite; in the latter, especially in very cold regions and in rigorous seasons, an abundant supply of this kind of diet becomes indispensable.

57. *b.* Although there are few articles of diet which a healthy person, leading a sufficiently active life, may not eat with impunity, there are many which ought to be preferred, and others which should be avoided, by the dyspeptic. *Vegetables* are slower of digestion than animal and farinaceous aliments, and more liable to undergo the acetous fermentation in weak stomachs, and to occasion acidity and flatulence. Fat and oily meats are also very indigestible, and give rise to acid or rancid eructations and heartburn. Soups and liquid food are acted upon by the stomach with great difficulty; and, if the diet consist chiefly of them, they furnish insufficient nourishment, and never fail of producing the more severe forms of dyspepsia, and the diseases of debility. Soups are hurtful when taken at the commencement of a full meal; but when little or no animal food is eaten along with them, and rice or bread is taken with them, so as to promote their consistency, they are digested with greater ease. Pastry, puddings, rich cakes, and articles containing fatty or oily matter, are the most indigestible of all kinds of food. Plain well-cooked animal food, particularly venison and game, kept a due time after it has been killed, and eaten in moderate quantity, with bread, or with roasted, mashed, or dry mealy potatoes, or with rice, is one of the most digestible meals that can be taken by the dyspeptic. The kind, however, of animal food, and the modes of dressing it, should depend much upon the state of disorder, and the age and constitution of the patient.

58. *c. Fish* holds an intermediate rank between the flesh of warm-blooded animals and vegetable food, as respects digestibility. It is less nutritious than mutton or beef; and a larger quantity is requisite to satisfy the appetite. Whiting, haddock, and skate, are the most digestible of salt-water, and perch of fresh-water fish. Gurnard, cod, soles, and turbot, are successively richer and heavier, but easier of digestion than mackerel, herrings, eels, or salmon. Eels are, however, more digestible when they are stewed. Salmon is very indigestible, as usually obtained from the London fishmongers, for the reasons stated in the article Disease (§ 46.); but it is not indigestible when quite fresh and properly cooked. The same observation applies to mackerel and herrings. Fish is most digestible when *boiled*; it is less so when *broiled*; and the least so when *fried*. The dyspeptic should eat it dressed only in the first of these ways. Shell-fish is slow of digestion; some much more than others. Raw oysters are more digestible than crabs or lobsters; but oysters, when stewed or otherwise cooked, are heavier than either. Fish is often rendered indigestible by the sauces, &c., taken with it. Vinegar, however, and lemon-juice promote the digestion of it. Malt liquor ought not to be drank with fish. Fruit should not be eaten with it; and milk, likewise, should be avoided.

59. *B.* The *quantity of food* should always be proportioned to the digestive powers of the stomach and the wants of the system. Where waste is great, and growth active, an abundant supply of food is requisite, and the desire for it is commensurate with the demand. Those who lead sedentary lives, and whose circumstances admit of free living, are peculiarly liable to dyspeptic complaints, owing chiefly to the quantity of food indulged in. It is indispensable to a due and natural supply of aliment to the stomach, that attention be paid to the preliminary processes of mastication and deglutition. If these be performed too hastily, too much food will be received in a short time, in a state of insufficient preparation, and the stomach will be overloaded, before the sensation of hunger can be completely allayed. As the dilatation of the stomach by the ingesta, should be gradual, and ought not to exceed a certain limit, and as a definite quantity of gastric juice is secreted, according to the wants of the system and the habits of the individual, if more than the usual quantity of food be taken, the organ will be over distended and a part of it will remain undissolved, producing the usual symptoms of indigestion. Such being the case even with the healthy, how much greater will be the disorder when excesses are committed by the dyspeptic. Sir F. Head very justly remarks, "that almost every malady to which the human frame is liable is, either by high-ways or by-ways, connected with the stomach; and I must own, I never see a fashionable physician mysteriously counting the pulse of a plethoric patient, or, with a silver spoon on his tongue, importantly looking down his red inflamed gullet, but I feel a desire to exclaim, 'Why not tell the poor gentleman at once — Sir, you 've eaten too much, you 've drunk too much, and you 've not taken exercise enough!'" — Dr. Abercrombie observes "when we consider the manner in which diet is generally conducted in regard to the quantity and variety of food and drink, instead of being astonished at the prevalence of indigestion, the wonder should be that any stomach, having such duties imposed on it, is capable of digesting at all." Much, certainly, is to be done in dyspepsia, by attention to the quality of the articles of food, but *much more depends upon the quantity*. Indeed the dyspeptic might almost be independent of attention to the former, if he rigidly observed the latter. This opinion is supported by the experiments of Dr. Beaumont, showing that the power of digestion is limited by the amount of gastric juice provided by the stomach — an amount varying with the modes of life and the wants of the system. It is superfluous to remark that second courses, served up to gratify the pride of the host, overcome the stomach, paralyse digestion, and occasion acute attacks of indigestion.

60. It is impossible to assign any rules respecting the quantity of food that should be taken, as it depends upon so many circumstances. Mixtures of different kinds of food are injurious to digestion,

chiefly by the inducement to excess in quantity, which the variety affords, and by the incongruity of many of the articles. When only one dish is partaken of, Dr. Combe remarks, there is less temptation to exceed the quantity, than when several are tried. The first intimations of a satisfied appetite, are warnings to stop eating, which should never be neglected by dyspeptics. If these be passed by, indigestion or an aggravation of it, where it is already present, will always result. The quantity of food should also have reference to the amount of exercise. When little or no waste is excited by exercise, the supply should be remarkably moderate, as well as digestible. Persons who have removed from the country, where they have enjoyed active exercise in the open air, and have consequently digested well a full diet, generally become dyspeptic when they have removed to large towns, and are subjected to very different circumstances, especially if they continue the same quantity of food, or if they increase it.

61. *C.* The *times of eating*. In general, five or six hours should elapse between one meal and another. Even in healthy persons, digestion of a full meal is seldom over in less than four hours; and in dyspeptics, it is seldom disposed of until a much longer period has passed. The stomach, also, requires an interval of rest after the process is finished, in order to enable it to enter upon the vigorous digestion of the next meal. If food be taken before the organ has recovered itself from its previous exertion, the secretion of the gastric juices, and the muscular contractions, will be imperfect. The whole of the gastric juice which the stomach can secrete in a given time being engaged in the digestion of the first meal, the one taken too closely upon it will be insufficiently acted upon, and thereby undergo fermentation. The intervals between meals should be in relation to the quantity eaten, and the habits of the individual as to air and exercise. When the latter are enjoyed, the periods may be much shorter than when the habits are sedentary.

62. For dyspeptics, as well as for healthy persons, the meals should be regulated according to the necessary occupations and habits of the individual. For those, observes Dr. Combe, who work by day and sleep by night, an early breakfast, an early dinner, and an early evening meal, will be most conducive to health. But for those who, against the laws of nature, keep late hours, late breakfasts and dinners are preferable.—Persons who eat suppers ought not to breakfast till one or two hours after rising; but those who dine late and eat nothing afterwards, require breakfast sooner. As a general rule, breakfast about half an hour or an hour after rising will be found most beneficial. Those who are obliged to rise very early, should take a cup of coffee or tea with a biscuit soon after getting up, and a more substantial breakfast about three hours afterwards. If exposure to cold, to the morning dews, or to unwholesome air, or to any other cause of infection be incurred in the morning, the stomach should be fortified by coffee or by breakfast. The dyspeptic, especially, ought never to travel, or to enter upon any exertion with an empty stomach, and never with an overloaded one.

63. As a general rule, not more than five or six hours should elapse from breakfast till dinner. For youth and convalescents, and for persons taking active exercise in the open air, the interval may be somewhat shortened; but for sedentary persons, it may be much prolonged. Much, however, should depend upon the appetite, which ought to have returned some time before dinner is taken. According to this, the most suitable time for this meal, is about two o'clock. As many dyspeptics as well as others cannot dine until much later in the day, ought nothing to be taken till five, six, or seven o'clock? or ought a light repast to be taken at one or two o'clock, and the appetite be chiefly reserved for a substantial meal at a much later hour? When dinner cannot be taken until eight or nine hours after breakfast, it will be necessary to have some refreshment in the meantime; but it should be in relation to the time that will elapse until dinner, and to the exercise taken. For persons of sedentary habits, a biscuit and a glass of water will be sufficient; but for the active and the young, especially if the interval be long, a more substantial luncheon is necessary. The habit of resorting to pastry-cooks for refreshment, and of taking wine with it, is generally prejudicial, and particularly in dyspepsia. When dinner cannot be taken until a late hour, it should always be postponed for half an hour or an hour, until excitement or fatigue has subsided.

64. When the dinner is early — from one to three o'clock — a light meal of tea or coffee and bread is necessary; but when the dinner is late, or little exercise is taken after it, tea or coffee should be used merely as a diluent, and no food ought to be eaten. After an early dinner, admitting of time for its digestion and a return of the appetite before a late hour, a third meal, of light aliments, and in moderate quantity, should be taken, particularly by persons engaged in the open air. When ultra-temperance is practised by the dyspeptic, particularly when he lives actively, and retires to bed with an entirely empty stomach, he is quite as likely to have disturbed sleep and unpleasant dreams, as if he had his stomach loaded. He may even be wakeful and irritable, or experience a sense of unpleasant emptiness or gnawing at the stomach. All these may be removed by a basin of arrow-root or sago, about an hour before bedtime. A light supper may therefore be taken, when the dinner is early; but it should be at least an hour or two before retiring to rest.

65. *D.* The dyspeptic, as well as other valetudinarians, inquire, *What ought we to drink?* but they rarely follow the question by the next important one, *When should we drink?* And they never inquire as to *the temperature at which fluid should be taken. a.* Respecting the *first* of these questions, it may be stated, that *water* — either spring water, or toast-water, is the safest if it be taken only according to the dictates of thirst. Whey, fresh small beer, soda water, and seltzer water, are of service in many cases, as will be noticed hereafter; but fermented liquors and wines require greater restrictions. The young dyspeptic ought never to drink any thing but water, toast-water, or whey. The more stimulating beverages will be prejudicial to him, unless during states of debility, for which it may be necessary to prescribe them medicinally. Of all these, spirituous liquors are the most injurious, and ought never to be taken in any form, nor in any variety of indigestion. Some of the asthenic states of the complaint, which are benefited by a moderate

use of wine, are exasperated by spirits, or even by malt liquors. Dr. BEAUMONT fonnd on examining ST. MARTIN's stomach, after a free indulgence in ardent spirits for several days, the villous surface covered with erythematic and aphthous patches, the secretions vitiated, and the gastric juice diminished in quantity, viscid, and unhealthy, although he complained of nothing, not even of impaired appetite. Two days later, when matters were aggravated, the erythematic appearance was more extensive, the spots more livid, and from the surface of some of them, small drops of grumous blood exuded. The apthous patches were larger and more numerous, the mucous covering thicker than usual, and the gastric secretions much more vitiated. The fluids, extracted from the organ, were mixed with much thicker ropy mucus and muco-purulent discharges, slightly tinged with blood. Yet ST. MARTIN complained only of an uneasy sensation, and a tenderness at the pit of the stomach, with vertigo and dimness of vision on stooping. The tongue was covered with a yellowish brown coating, and the countenance was somewhat sallow. After a few days of low diet with mild diluents, the inner surface of the stomach assumed its healthy state, the gastric juice became clear and abundant, the secretions natural, and the appetite voracious. Dr. BEAUMONT adds, that the free use of ardent spirits, wine, beer, or any intoxicating liquor, when continued for some days, invariably produced these morbid states. Eating voraciously or to excess, and swallowing food imperfectly masticated, or too fast, produced the same effects when repeated frequently in close succession. (*Exper. and Observ. &c.* p. 237.). He often observed that, when stomachic disorder, with febrile symptoms, was present, or when influenced by violent mental emotions, the villous coat of the stomach became red, irritable, and dry; and that but little gastric juice was secreted on the food being taken, digestion being very much prolonged. No more wine, therefore, nor more of any other fermented liquor, should be taken, than may be found sufficient to support the strength and ameliorate the symptoms of the dyspeptic, without quickening the circulation.

66. *b.* As a general rule, the *desire for fluids* is the chief indication of *the time* at which they ought to be taken; but large draughts should be avoided, as the stomach becomes suddenly distended, the juices diluted, and the muscular coat weakened by them. Besides, much more fluid may be thus taken than is necessary for the wants of the system. The dyspeptic ought never to drink largely, either during, or soon after, a meal. Frequent sipping, or drinking by mouthfuls, will be much more beneficial, and ultimately, more quenching of thirst. Mild drinks are best taken about three or four hours after a solid meal. It is then that tea and coffee are used as beverages. These are always injurious when made too strong, or taken in large quantity, especially to the dyspeptic. Soda water drank at the time of dinner is hurtful, by distending and over exciting the stomach. Seltzer water is less so; but it is often of service some time after a meal, when there is much thirst. Soda water is then sometimes also of use.

67. *c.* The *temperature at which fluids should be taken* is of the utmost importance to the dyspeptic. *Extremes* of temperature are injurious even to the healthy, and not only to the stomach but also to the collatitious viscera, and to the teeth. The bad effects of the ingestion of large quantities of cold water into the stomach have been often demonstrated; but the subject has been very superficially considered. Dr. BEAUMONT remarked, that a gill of water, at the temperature of 55°, received into ST. MARTIN's stomach when empty, reduced the heat of the organ from 99° to 70°, at which it stood for a few minutes, and then rose very slowly. This experiment explains the injurious effects produced upon weak stomachs by cold fluids taken during digestion, and the fatal effects of very copious draughts of cold water whilst the body is fatigued and perspiring; the shock which the constitution receives from having the temperature of the most vital and central organ suddenly and remarkably depressed, paralysing the other vital movements. It having been demonstrated, that a temperature of 98° is requisite to healthy digestion, it must follow, that the use of ices, and particularly iced creams after dinner, or when digestion is proceeding, will be most injurious. A fit of indigestion is often caused by them; and they seldom fail of lowering the vital tone of the stomach during the digestive process. The moderate use, however, of cold or iced water, or of water ices, when this process is completed, and when there is no exhaustion, is beneficial, by inducing a salutary reaction in the organ. Ices can be only taken slowly, and in small quantities at a time; hence they produce a much less sudden fall of temperature of the stomach than draughts of cold fluids. Dr. DUNGLISON states, that labourers in Virginia were frequently killed by drinking copiously of spring water when over-heated; but that such accidents have rarely occurred since they have been supplied with ice. The proper temperature at which soups, tea, coffee, chocolate, &c., should be taken, may be stated at about 100°; and at this grade of heat, liquids will be found more quenching to thirst than at a higher or lower temperature.

68. *E.* The *conditions necessary to promote a healthy digestion* require a brief notice. The determination of the circulating fluids to the digestive mucous surface and collatitious viscera, and the copious secretion from these viscera during digestion, require that the function should not be disturbed by moral or physical perturbation or exertion. Rest of body and tranquillity of mind for a short time before and after, but particularly after eating, is hence conducive to digestion. Whatever derives the nervous energy and the circulating fluids from the digestive viscera, or causes oppression of these viscera by over-loading the large veins, is injurious during digestion. Hence blood-letting, hot or cold bathing, mental shocks, exertions of any kind, and other circumstances which operate in this way are more or less hurtful. As the quantity of gastric juice requisite to the digestion of a full meal is generally secreted in an hour or an hour and a half after it is taken, or at least within two hours even in the dyspeptic, bodily and mental repose is beneficial during this time. It is thus that a *siesta* after dinner is found so serviceable to the dyspeptic. But, by promoting digestion, it favours supply, diminishes waste, and consequently induces vascular plethora, and the usual consequences of

this state, particularly in respect of the brain and liver. In dyspepsia, the desire for rest after a repast is great in proportion to the quantity eaten, the nervous energy being concentrated in the digestive viscera, in order to dispose of the ingesta. The state of the mind has a powerful influence on digestion: hilarity and ease of mind promote this function; whilst care, anxiety, envy and dissatisfaction, impede it. Dr. Caldwell remarks, that dyspepsia commences perhaps as often in the brain as in the stomach. It is almost exclusively a complaint of the studious, the scheming, the daring adventurer, the stock-jobber, and the speculator, and of those who, over-exerting their brains, thereby injure them.

69. ii. *Of the Diet and Regimen with reference to the different states of Dyspepsia.* The observations of Dr. Todd as to the diet suitable to the different states of dyspepsia, are extremely just and precise; I shall, therefore, avail myself of some of them. *A. During the asthenic forms of indigestion,* the quantity of food should be reduced to the power of disposing of it; such articles as are difficult of digestion and weaken the stomach being altogether withdrawn.—*a.* The patient should be confined to a spare diet of animal food, and to a restricted use of fluids. A bulky meal ought always to be avoided; and when the appetite is impaired, abstinence will be frequently preferable to the use of stomachics. When the appetite does not fail, which is often the case when dyspepsia is produced by mental exertion, the patient should cease eating before the appetite is altogether allayed. The tea or coffee at breakfast should be taken with very little milk and sugar, and very little butter ought to be used. An egg, lightly boiled, may be eaten by those who take sufficient exercise. The dinner should consist of lean animal food, particularly mutton, poultry, game, and venison, which ought to be roasted or broiled. Bulky vegetables should be avoided; but mealy potatoes, yams, or rice, mixed with the gravy of the meat, young summer turnips, cauliflower, or French beans, may be taken sparingly. The least hurtful fruits are strawberries, morel cherries, and mulberries; but they should be eaten as a part of the luncheon, rather than after dinner. Fluids, even when there is thirst, should be taken slowly, and in small quantity, and always after a meal. If the digestion or habit require the stimulus of wine, old sherry or old port, with an equal part of water, should be preferred; but the quantity of either or of both should not exceed two or three glasses. Twice-dressed meat, *rechauffées,* and made dishes, ought not to be eaten; and the food should be masticated slowly and thoroughly.

70. *b.* The *kinds of food* most injurious in this variety of dyspepsia, and therefore to be avoided, are sweet, mucilaginous, or acid fluids, and such as contain much milk; puddings, compound dishes, and meat pies; new bread, or heavy unfermented bread; compact or fat dumplings, and pultaceous articles; creams, curds, custards, cheese, and all preparations of milk; fat meat, particularly pork or bacon, young meat, all gelatinous parts of meat, and salted or smoked meat; the less digestible species of fish, and all shell-fish; strong broths, gelatinous soups, or concentrated dishes; melted butter, oil, sauces, spices, condiments, and pickles; bulky or flatulent vegetables, especially cabbages, waxy potatoes; pot-herbs, beans, peas, cucumbers, &c.; most fruits, whether fresh or preserved; currants, gooseberries, apples, plums, melons, all kinds of nuts or kernels, and preserves or jellies. Malt liquors, particularly ale, perry, cider, home-made wines, punch, and shrub should also be avoided.

71. *c. Regular exercise* ought to be taken in th open air; and the kinds of exercise that bring th greatest number of muscles into moderate action should be preferred. Celsus very justly advises persons subject to stomach complaints, to exercise the upper extremities and parts of the body. There are several amusements which have this effect, especially billiards, fencing, rowing, cricket, &c. For females, singing, dancing, skipping, battledore, dumb-bells, and the exercises recommended by Mr. D. Walker, will be found very serviceable, especially when confined to the house by weather, or when exercise on horseback or on foot cannot be taken.

72. *B.* The *diet and regimen most suited for the irritative states of indigestion* differ considerably from those now recommended. In this variety, bland, farinaceous, and semi-fluid food, in small or moderate quantity, is the most appropriate, until vascular disorder of the villous coat of the stomach is removed by treatment. Saccharine, farinaceous, feculent, mucilaginous, and acidulous articles of food are most easily digested in this condition of the organ. Gentle exercise, as gestation in a carriage or on horseback, sailing, swinging, and walking, is preferable to the more exciting kinds of exercise. After digestion is completed, tepid or warm bathing, and frictions of the surface, are generally beneficial. When vascular excitement is removed, the patient may gradually adopt the diet advised for the preceding variety, beginning with light chicken, mutton, or veal broth, with toast or rice; and afterwards the more digestible kinds of solid food may be used.

73. *C.* The *wines and beverages* best suited for indigestion are old sherry or port diluted with equal parts of water, the finer kinds of claret, hock, white hermitage, and Sauterne; but these should not be taken in the irritative forms of dyspepsia until vascular excitement of the villous coat of the stomach is removed. The diluents most beneficial are seltzer water with a small quantity of hock, or seltzer water with milk or whey, or lime-water with milk or black tea, according to the peculiarities of the case. In the more irritable states of the stomach, whey, goat's whey, small quantities of seltzer water, or the imperial drink, should be preferred. When the state of the urine indicates the impropriety of using vegetable or mineral acids, the alkaline carbonates may be substituted; but, when indigestion has induced a torpid or disordered state of the biliary organs, not connected with inflammation, beverages slightly acidulated with the nitro-hydrochloric acids will be found serviceable.

74. *D. Several mineral waters,* both natural and factitious, are most excellent aids in the treatment of the several forms of indigestion.—*a.* In the *asthenic variety,* the mineral springs of Clifton, Malvern, Bath, and Tunbridge Wells, and the carbonated chalybeate waters of Spa, Pyrmont, Carlsbad, Marienbad, Swelbach, and Eger, on the Continent; or their imitations prepared by Dr. Struve, are generally beneficial.—*b.* In the *irritative states* of dyspepsia, the springs o

Harrowgate, of Ems, Plombières, Vichy, and of Marienbad, or other alkaline mineral waters, will be used with advantage. When the functions of the liver are disordered, the waters of Cheltenham or Leamington, or of the Beulah Spa, and the springs of Seidschutz and Pullna may be preferred; but when excitement of the villous coat of the stomach, and when the functions of the excreting viscera are restored, the aerated chalybeate waters, already mentioned, will be most serviceable.

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INDURATION. — SYNON. *Induratio* (from *Indurare*) to become hard. *Induration*, *Endurcissement*, Fr. *Induramento*, Ital. *Die Hürtung; verhürtung*, Germ. *Hardening*.

CLASSIF. — GENERAL PATHOLOGY. — *Morbid structure — Therapeutics.*

1. Induration is either *physiological* or *pathological*. The former proceeds — *first*, from the changes which take place in the tissues during the progress of AGE (see that article); and *secondly*, from the increased nutrition and vital cohesion, consequent upon great activity of the vital manifestations of the part. This latter state, however, can hardly be termed induration. The *general pathological relations of induration* only require notice at this place. The specific conditions of it in the different tissues and organs are noticed in the articles on the pathology of these parts.

2. i. Induration may exist in a *simple state*, and unconnected with any apparent deposition of fluid or morbid product. In this case, it is merely a greater density of the natural structure, owing to some change in its nutrition, without any morbid secretion or further lesion of organisation. Various tissues and organs occasionally present this alteration, as the brain, the liver, the muscular structure of the heart, the cellular and fibrous tissues, the bones, the glands, pancreas, ovaries, &c. It may be independent of any change in the size or form of the part; but it is often connected with an increase of size, constituting *hypertrophy with induration*.

3. ii. Induration may depend upon an *infiltration of a fluid or solid matter* into the areolar or peculiar structure of a part — of serum, lymph, albumen, fibrine, or even of blood. The excited, or otherwise altered, action of the capillaries of the part may give rise to the effusion of these matters in a more or less fluid state; but they subsequently undergo various changes as to consistence or even organisation, their watery parts being absorbed, and the albuminous or fibrinous portions becoming more or less changed, or even identified with the structures which they infiltrate. Many of the lesions observed in the cellular tissue and parenchymatous organs — in the lungs, liver, spleen, glands, &c. — are owing to this species of alteration.

4. When the matter thus deposited is of a *peculiar or adventitious nature*, whether pre-existing in the blood, or produced by a change in the vital condition of the part, or of the constitution, the tissues, which are the seat of induration, undergo a succession of changes, and they as well as the matter which infiltrates them, or is deposited in them, assume peculiar forms, as in scirrhus, cancer, &c.

5. iii. Induration may proceed from the *absorption of the more fluid constituents of the tissues.* This seldom occurs, excepting from compression, owing to the effusion of fluid, or the development of morbid structures in their vicinity, or in enveloping parts. Effusions in the pleura and false membranes formed on its surface produce this change in the lungs; and the fibrous or fibro-cartilaginous formations in other situations produce a similar alteration, as in the spleen, &c. This form of induration may often be said to be rather a state of condensation or atrophy with induration. The distension, produced by the accumulation of natural secretions cannot be comprised amongst the forms of induration.

6. iv. Indurated parts *vary in appearance* — in colour, size, and form. 1. The *colour* is generally

changed, being often pale, owing to diminished vascularity and the deposit of albuminous matter; and sometimes red, greyish brown, yellowish, &c. These hues evidently depend upon the vascularity, and the state of stagnant fluids, and of effused or infiltrated matters. 2. The *size* of indurated parts may not be changed; more frequently it is increased, and sometimes it is diminished. 3. The *form* of the indurated part may or may not be altered.

7. v. The *causes* of induration may, in general terms, be stated to be whatever excites the vital actions of the part, or occasions a slight or protracted irritation of its capillaries. Induration from compression, however, cannot be ascribed to these causes. M. Andral remarks that,—1. Irritation may be the first phenomenon apparent, evidently preceding irritation and continuing with it.—2. Irritation, having produced induration, may cease, induration alone continuing.—3. Induration sometimes occurs without any evidence of pre-existing irritation.—4. At an advanced period of induration, the quantity of blood sent to the part is actually less than before its induration, its vitality being also less than before this change of structure.—5. In some cases, a secondary irritation may arise, at a longer or shorter period after the formation of induration. This secondary irritation sometimes restores the indurated part to its healthy condition; but more frequently it is productive of the most injurious consequences, causing ulceration, softening, &c.

8. vi. Treatment.—Induration in vital organs can seldom be ascertained, so as to enable the physician to enter upon its treatment with much hope of success. Alterations of sensation, motion, and size, sometimes lead to a belief in its existence. When these exist with weight or tension, and marked disturbance of function, vascular depletion, general or local, according to circumstances, derivatives and courses of alteratives, are the chief means upon which reliance can be placed. The alkaline solutions, the preparations of iodine, and mild mercurials, with narcotics, are sometimes useful; and the various modes of deriving irritation to external parts, should not be neglected. But both alteratives, deobstruents, and derivatives, ought to be continued for a sufficient time to test their efficacy. When the indurated part is near the surface, deobstruent plasters, and frictions with discutient liniments, embrocations and fomentations, may be severally employed. In all cases, it is necessary to prevent disorder of the digestive organs, to allay pain and irritation by anodynes, to promote the natural secretions and excretions, and to preserve the constitutional powers by light nourishment and change of air. When induration proceeds from compression, the removal of the compressing cause should be attempted, if circumstances admit of its accomplishment.

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INFECTION.—Syn. From *Inficio. Contagium, Conterges, Contagio* from *con* and *tango*, Lat.; *Infection, Contagion*, Fr.; *Austeckung*, Germ.; *Infezione, Contagione*, Ital. *Contagion*.

Classif.— General Pathology — *Etiology*. General Therapeutics — *Prophylactics*.

1. In the view which I am about to take of infectious agents, of their operation, and of their effects, it will be necessary to premise a few remarks as to the meaning I would attach to the word *infection*, as well as to other terms which have been usually considered as synonymous with it, or as expressing modes of the same agency. By some writers, the words *infection* and *contagion* have been received as altogether synonymous, whilst others have drawn distinctions between them. Few, however, of the latter have agreed on the subject. Quesnay first attempted to give precision to the application of these terms, but with little success. Since his time the word *infection* has been commonly applied to the communication of disease from the sick to the healthy, by a morbid miasm or exhalation diffused in the air; and the word *contagion* to the transmission of a specific malady by immediate or mediate contact. But it is obvious that these are merely modes of the same agency in the majority of instances; for the humidity of the air becomes a medium of contact in the former, as much as the clothes of the sick are the media of it in the latter, the chief difference being, that the one acts only by being diffused in the air, whilst the other may act either in the same way, or it may directly convey a consistent virus or morbid secretion. In cases where substances have become the media of absorbing and retaining the morbid emanations or the effluvia of specific diseases, and thereby transmitting them, it must not be inferred that the infection is produced by contact of any part of the external surface of the healthy person with the substance thus imbued. The clothes worn by a person whilst labouring under a disease strictly contagious, even according to the above acceptation, may be so imbued with the morbid exhalation as to retain it for a long time, especially if shut up from the air, and may afterwards emit it upon being unfolded and exposed, and thereby propagate the disease to an individual who has never come in contact with the substance which has thus proved the *fomes* of contagion. Instead, therefore, of considering these distinctions as constituting a true difference, it will be preferable to view *contagion* as a *mode* of infection, to which certain limitations should be attached.

2. M. Rochoux considers that infectious agents may be divided into those which, like germs, are capable of reproducing and multiplying themselves as organised bodies, and into those which are devoid of this character, and require for their propagation certain accessories, without which they will not appear. The former of these represent contagions, the latter infections. M. Dupuytren observes, that *infection* is the contamination of the air by persons confined in low, close, ill-ventilated, and dirty situations, and by vegetable and animal substances undergoing decomposition, the emanations with which the air is thereby charged acting on man as poisonous agents. The sources of these emanations are

active in proportion to the grade of atmospheric humidity and temperature, and to the nature and quantity of the miasms which the air contains. *Contagion*, on the other hand, he considers to be in many respects independent of atmospherical conditions, and a species of germ or virus developed in the bodies of the sick, or forming an atmosphere around them containing the principle of the malady; and through the medium of this germ, virus, or morbid principle, the malady is transmitted to the healthy. When we consider the diverse states and kinds of agents to which the terms infection and contagion have in general been indiscriminately applied, and the close approximation of several of these agents to each other, as respects their properties and effects on the living economy; and when we further consider the modifications each of them experiences in the ever-varying conditions in which they present themselves, and from the several circumstances and accessory influences which are associated with them, the difficulty of assigning to them specific distinctions will be evident. Yet the difficulty should not preclude attempts at distinctions, and at arrangements founded on such distinctions, as a greater precision of knowledge than now exists will, to a certain extent, result even from a partial attainment of these objects, and will be extremely conducive, not only to an acquaintance with the influences by which these agents are modified, and with the changes they effect on the human economy, but also to the suggestion and acquisition of means by which their effects will be prevented, or be counteracted where prevention cannot be accomplished. The chief fault of distinctions drawn between *infection* and *contagion*, and at the arrangement of the various modes and kinds of these agencies, is, that both the one and the other are based upon preconceived and narrow views of their nature and operation, involving, moreover, various opinions by no means consonant with the usual procession of morbid actions. The obvious course, therefore, is to make distinctions only where differences actually exist, applying terms with precision, according either to their received meaning, or to the sense in which it is desired to receive them, and to arrange phenomena according to the relations established by close observation and candid description. In the following remarks I use the word *infection* in its *generic* acceptation, employing it according to the meaning attached to it by Virgil, Ovid, Pliny, and other classical writers of antiquity, and by many modern authors; and applying it to whatever may effect, so as ultimately to *taint*, *pollute*, or *corrupt the body*. I use also the word *contagion* in the sense imposed on it by Virgil, Pliny, Columella, and Curtius—as an *infection by immediate or mediate contact*—as a *pollution by the touch*. The word *contamination* may with justice be applied to the deterioration or morbid change which takes place in the fluids of the body during the course of infectious maladies. The terms *morbid impression* and *morbid influence* will represent the change first produced, particularly on the nervous system, by the agents of infection. Although the effluvia or emanations from the sick, the secretions formed in the course of infectious diseases, and the putrid fluids in the bodies of the dead, generally act upon the living, when applied in a manner suited to the operation of each, as *animal poisons*, yet I will restrict this term to those agents which are usually thus designated.

3. From this it will appear that the word *infection* is here employed in its most extensive application; and that the words *contagion*, *contamination*, *morbid impression*, or *influence*, are used to express the chief modes in which it takes place, and the chief states in which it may exist. Receiving therefore *infection* as the generic appellation, the other terms represent *species* arranged under it. In other words the frame may be infected — 1st, by the *morbid impression* of agents — *internal* or *self-generated*, or *external and mephitic*, the infection being limited to the individual, and incapable of propagating its kind. — 2ndly, by the *contamination* produced by animal effluvia, the infection being capable of propagating itself in certain ascertained circumstances, and of spreading to the healthy from those affected by these agents. 3rdly, by the *morbid impression* or *contamination* of specific emanations and secretions, the infection presenting certain specific effects, or disseminating and perpetuating specific maladies.

4. The various influences and agents, by which the human frame is infected throughout, come under one or other of these modes of operation. They consist chiefly or miasms or exhalations from vegetable matters in a state of decay; of unwholesome or noxious ingesta; of effluvia from dead animal matter; of the emanations from the healthy in confined situations, and from the sick in several diseases, and in the various circumstances favourable to their accumulation or concentration; of septic matters arising from animal decay; and of palpable or more or less consistent secretions. But several infectious agents may be associated in their operation. The miasms or exhalations from decayed vegetable matter, or from the soil, &c. may be conjoined with the effluvia from animal substances. Some of them may act directly, or in the vicinity of their sources only, as those derived from vegetable and animal decay. Others not only operate in this way, but also through the medium of substances which imbibe and retain them in a sufficient quantity to be injurious. They admit however of certain general propositions being stated with respect to them; and of the following arrangement, with reference both to their nature and effects.

a. *Infecting agents* consist almost entirely of decayed or diseased organised substances, and of animal emanations or secretions.

b. Those agents which proceed from the decay of vegetable substances or principles, although they infect the frame exposed to their sources, are yet incapable, when unaided, of producing those states of action generating a seminium, or morbid principle by which they may be propagated from the sick to the healthy.

c. Organic bodies in a state of decay or disease, and animal secretions, *infect* the human frame chiefly during states of predisposition or susceptibility of the frame, certain only of which states are ascertained.

d. The *morbid actions* produced by infectious agents generally assume specific forms according to the nature of the agent, so that the agent being known, its effects may be predicated; and on the other hand, the nature of the agent may be inferred from the form and characters of the existing effect.

CLASSIFICATION OF INFECTIOUS AGENTS.

Class of Agents.	*Order of Agents.*	*Species of Agents.*	*Diseases resulting therefrom.*
I. Non-disseminating, and non-perpetuating Infections. *Idio-infectants.*	i. *Miasms or mephitic vapours—Endemic Infection—acting through the air.*	1. Miasms from decayed vegetable matter aided by moisture, in temperate ranges of atmospheric heat.	Catarrhal fevers. Rheumatic attacks. Intermittents. Enlargements of the spleen; and torpid states of the liver.
		2. Exhalations from absorbent, or deep, exuberant, or marshy soils, suspended in atmospheric humidity at temperate grades of warmth.	Intermittents. Remittents. Simple dysentery. Simple cholera. Bilious fevers. Obstructions and other diseases of the liver and glandular organs.
		3. Miasms or vapours from decayed vegetable matter, or from marshes and rich, deep, and humid soils, at high ranges of temperature.	Inflammatory, bilious, and gastric fevers of both a remittent and continued type. Diseases chiefly of the abdominal viscera.
	ii. *Unwholesome and poisonous ingesta*—Infections occasionally epidemic.	Unripe, diseased, or decayed grain. Diseased or putrid fish or flesh. Water containing putrid animal matters, &c. &c. &c.	Ergotism. Gangrenous ergotism. Asthenic and chronic diarrhœa. Dysentery. Scurvy and scorbutic dysentery. Mucous, gastric and putro-adynamic fevers.
	iii. *Self contaminating agents*, or morbid matters formed in a part, afterwards contaminating the system generally.	1. Cancer. Fungo-hæmatoid disease, &c.	The carcinomatous and fungo-hæmatoid cachexy.
		2. Purulent, sanious, or other morbid secretions carried into the circulation.	Acute hectic. Low remittent, and adynamic states of fever, often attended by phlebitis or purulent deposits in the viscera or joints.
II. Conditionally perpetuating Infections. — *Contaminating infections.*	i. *Animal effluvia.*—Producing diseases propagating the same or similar maladies in favourable circumstances. *Conditionally and consecutively infectious*, chiefly by means of diffusive and impalpable emanations.	1. Effluvia from animal matter or from vegeto-animal matters during decomposition, aided by humidity.	Adynamic or pernicious remittents. Continued fevers. Adynamic dysentery. Cholera. Gastric, mucous, or enteric fevers.
		2. Emanations from living bodies in close or unventilated situations.	Adynamic putro-adynamic, and malignant fevers. Malignant dysentery.
		3. Emanations from the secretions and discharges of the sick confined in close apartments, &c., and the direct application of these secretions.	Erysipelas. Hospital gangrene. Phlebitis. Puerperal fever.
	ii. *Animal secretions and septic animal matters.*—Infectious chiefly by contact, or inoculation of a palpable matter; *chiefly sporadic.*	1. Morbid secretions in recently dead bodies.	The irritative fever, or malignant effects produced upon opening recent bodies, by the morbid secretions poured out in serous cavities.
		2. Animal matter in a state of putridity or decomposition.	Diffusive or disorganising inflammation of cellular parts. Inflammation of lymphatics of veins, &c.
		3. Morbid secretions communicated from the lower animals by contact or inoculation.	Glanders. Farcy malignant pustule and other affections arising from contaminating diseases in the lower animals.
		4. The poisonous bites of insects and reptiles.	General vital depression, and septic disorganization, or solution of the vital cohesion of the tissues.
III. Specific Infections. — Infections immediately or mediately disseminating and perpetuating their kinds, by a morbid impression, or by contamination, or by both. Capable of retention and communication by Fomites.	i. *Impalpable specific infections* of susceptible persons. Diffusive or volatile infections, frequently epidemic.	Emanations from the secretions, excretions, and surfaces of persons already affected. — Propagating their kind by a diffused and impalpable effluvium, or vapour.	Epidemic and exanthematic typhus. True yellow fever. Pestilential cholera. Pertussis.
	ii. *Palpable specific contagions.* Consistent contagions.	A specific secretion or virus from the seat of disease perpetuating maladies always presenting the same characters.	Rabies. Syphilis. Gonorrhea. Scabies. Yaws. Sivvens. Frambœsia. Purulent or Egyptian Ophthalmia. Cow-pox. Pellagra. Porrigo.
	iii. *Infectious both diffusive and consistent.*—Often epidemic.	Diffusive and impalpable emanations, and consistent secretions, from the bodies of the infected, either of which may produce the same disease.	Chicken-pox. Scarlet fever. Small-pox. Measles. Malignant puerperal fever. Plague.

5.—I. The Sources of Infection.—According to the extensive sense in which I have employed the term infection, its sources or agents are numerous and diversified. They may be arranged —1st. Into Idio-infectants, or those which produce diseases incapable of perpetuating their kinds, unless other causes be superadded; — 2d. Into those which produce maladies which may be propagated under favourable circumstances — or into *conditionally perpetuating infections*; — and 3d. Into *Specific Infections*, or those which produce diseases which perpetuate their kinds, both immediately, and mediately by *fomites*.

6. i. — Under the First Class may be arranged those infections derived from (*a*) endemic sources; — (*b*) from the ingesta; — and (*c*) from morbid matters generated in the body, and conveyed into the circulation, thereby contaminating the whole frame. The diseases proceeding from these sources never give rise to the infection of the healthy, unless they are modified in their characters by superadded causes, or unless they are materially influenced by determining or consecutive circumstances. — A. The *miasms or exhalations from the soil* produce a great variety of diseases according to the temperature and humidity of the air, and the quantity or activity of the miasms floating in it; but the diseases thus produced will not propagate themselves. If, however, other causes are superadded, — if the persons labouring under disease from this source be confined in ill-ventilated apartments, or breathe a close air

loaded with animal exhalations, the disease may change its form, and assume some one or other of those which arise from the *second class* of causes—from animal effluvia,—and thus become consecutively and conditionally infectious. I could adduce numerous instances of diseases, originating in local or endemic sources, becoming thus infectious. Livy adduces more than one instance of it; and numerous others are furnished in the medical histories of wars and campaigns; but unfortunately the circumstances connected with them have rarely been recorded with precision, and sometimes not even with impartiality.

7. *B.*—The *use of unwholesome food* infects the body with disease, which is not capable of being communicated to the healthy under ordinary circumstances. But persons affected with diseases from this source may be exposed to additional causes which will change the character and course of these diseases, and give rise, as in the foregoing instances, to a truly infectious property. It is well known that unwholesome and scanty nourishment will produce scurvy, scorbutic dysentery, and low or adynamic fevers. These fevers are generally not capable at first, or as they immediately proceed from this cause, of propagating their kinds, but they frequently assume this character, owing to states of the air, to insufficient ventilation, and to the manners and imperfect civilization of those amongst whom they occur. Proofs of this were furnished in Italy and France during 1815, 1816, and 1817,—at Marseilles in 1812, and 1813,—in Ireland during various periods, particularly since the commencement of this century, and even in the present day in some parts of England. The disease which prevailed in the Penitentiary, and which was so ably described by Dr. Latham, and the fevers now prevalent among the poor, are proofs of the infectious characters which distempers thus originating generally assume. I am convinced that the low dietaries assigned to the poor in the Union workhouses, in connection with crowding, and with imperfect ventilation, in many of them, have been a chief cause of the present prevalence of typhus throughout the country. And although the infectious visitation may not have reached those who have been the prime movers in the iniquity, yet it may overtake some of them with no measured retribution. Persons who require the aid of the Poor Law have usually as respects food or drink, and sometimes as regards both, lived fully or intemperately; and when they are subjected to a diet, altogether insufficient for the continuance of health even in the temperate, low fever, which readily propagates its kind among the predisposed, and on occasions favouring communication, soon makes its appearance. This result the more certainly follows, when numbers are similarly circumstanced, and placed in buildings possessing no thorough ventilation or perflation of air. The only recently erected Union workhouses which I have seen, are most improperly planned, inasmuch as they have windows only looking into the interior of the Court, of which they form three of the sides. This is shameful if it proceed from ignorance, and flagitious if it be done designedly. We can hardly suppose architects so ignorant of the most generally acknowledged principles of their art, as to neglect ventilation where it is most required. Are we therefore to consider that they have been controlled by those who have sacrificed feelings of humanity to the expediency of political economy?

8.—From considerable observation and reflection, I infer that disease may take place sporadically, or from local causes; and owing to various circumstances acting either in close succession or coetaneously, the circulating and secreting fluids, and even the soft solids, may be so changed during its course, as to emit an effluvium contaminating the surrounding air and thereby infecting many of those who breathe this air in a sufficiently contaminated state; and thus the disease will be propagated to several, and from these to others, especially under favourable circumstances of temperature, humidity, electrical conditions and stillness of the air, and of predisposition on the part of those who come within the focus of infection. Thus diseases may become *infectious*, and, when aided by the constitution of the air, and other circumstances, even *epidemic*. After thus spreading for a time, they may cease or entirely disappear with the circumstances which combine to propagate them.

9. *C.*—The *Self-contaminating agents*, or morbid matters formed in a part, and afterwards infecting the system generally, but seldom, perhaps, give rise to disease, capable of propagating its kind. When sanious or purulent matters are carried into the circulation, the consequent alteration in the blood gives rise to phenomena closely resembling typhoid or low fevers in many cases; but I do not believe that the malady thus produced will infect the healthy, unless under circumstances peculiarly favourable to infection, as in puerperal females, in the wards of lying-in hospitals. I think it extremely probable, that the sanious fluid constituting the lochia may be absorbed or imbibed from the surface of the uterus, particularly when the uterus contracts imperfectly, or when the discharge is retained or accumulates, and when vital power is much depressed, and that the consequent pollution of the circulating and secreted fluids will give rise to an effluvium which may produce puerperal fever in a female recently confined, if she come within the focus of infection. It is not improbable, that erysipelas also may be excited by the effluvium emitted from a person thus diseased. I attended with another practitioner, a case of dangerous puerperal fever of this kind. A lady visited this patient, and leant close to her mouth, so as to hear her faint articulations, but perceived her breath so offensive, and felt it produce so unpleasant a sensation on her own face, as to induce her to remove to a greater distance. This lady continued to perceive the unpleasant odour, and to feel the sensation in the face until the following day, when she experienced chills with swelling and redness about the nose, extending over the face;—a complete attack of erysipelas followed.

10. That the morbid secretions of persons affected with low fever, consequent on the absorption of morbid matters, into the circulation, will infect the healthy frame when inserted into a wound or under the cuticle, or even when applied to a mucous surface, is by no means improbable. I have seen the most dangerous diseases arise, from the inoculation, and even from the contact of the fluids during the examination of the bodies of females, who had died of puerperal disease, caused

by the passage of sanious or morbid secretions into the circulation, as well as by the influence of an impure air. The danger of infection or inoculation from these cases is great in proportion to the shortness of time that has elapsed from dissolution; and it is particularly great when the body still retains some of its warmth. The above considerations and facts prove that, although the several orders of agents comprised under the *first class* produce merely a sporadic form of infection, or infect merely those exposed to their sources, and give rise to diseases generally incapable of propagating their kind, yet the concurrence of additional causes or influences, during their course, will develope a disease capable of being communicated to the healthy under circumstances of predisposition, and in similar modes, as well as by the same media, as the diseases produced by the class of agents next to be noticed.

11. ii. *The second class of agents.* *A.* Effluvia from *animal exuvia* and *animal secretions and excretions* directly occasion those forms of disease which infect the healthy by contaminating the surrounding air. The particular *form* or *species* of malady thereby produced, depends much upon the nature of concurrent causes — upon the concentration or accumulation of the effluvium, — upon its sources, — upon its admixture with miasms from decayed vegetable substances,—upon the temperature, humidity, and electrical states of the air, — upon the susceptibility or state of predisposition of those exposed to it,— and upon pre-existing disorder. The operation of some of the sources of infection falling under this head has been disputed. Dr. Bancroft, by a laboured special pleading, has denied the injurious influence of putrifying animal substances; but much depends upon the temperature in which this process takes place, the concentration of the emanations arising from this source, and epidemical states of the air. When the temperature is low, and ventilation is preserved, no very acute or sudden disease results from this cause, particularly to those accustomed to it, although a gradual loss of health generally follows its continued or frequent influence. But in other circumstances, particularly when aided by concurrent causes and marked susceptibility, febrile diseases of a low or adynamic form, and of an infectious character, where free ventilation is not preserved, generally appear. The emanations from the lower animals, as horses and cattle, crowded in ill-ventilated places, produce infectious diseases, not only amongst them, but also in those of the human species, who may breathe for some time the air which is thus contaminated. Livy, Dionysius of Halicarnassus, and Orosius, mention a destructive disease which appeared in Rome 464 years before Christ. Livy states that it occurred in Autumn from the crowds of countrymen and herds of cattle received within the walls of the city; that it was aggravated by the infection arising from the crowded state of the close buildings, by the heat and want of rest; and moreover that the disease was propagated by contagion and by the attendants on the sick. The same historian records that, in the 325th year from the foundation of Rome, a remarkable drought and famine extended throughout the Roman territory: that diseases followed, first invading cattle, and afterwards infecting the rustics and lower classes of people, and then extending to the city. That disease of an infectious nature may be developed in the lower animals by their confinement in close or ill-ventilated places has been proved on numerous occasions; and there is no reason to doubt the possibility of the distemper thus produced being communicated to the human species. A number of horses shut up in the hold of a transport will generate glanders in some of them, the morbid secretion of which will communicate a similar disease to persons employed about those which are affected, especially if it come in contact with the mucous surfaces. It may be stated as an axiom, that the foul air generated by the crowding of many persons or animals into a confined space, even in health, but more especially in disease, as in the wards of hospitals, &c.; or by a few persons only in the same apartment, if their diseases be attended by copious discharges, will infect those who breathe it in a state of predisposition, with low fever, dysentery, &c.; and that the persons thus infected will communicate the malady to others similarly predisposed. Although animal effluvia infect the healthy chiefly by their diffusion in the atmosphere, yet the infection will not take place, unless near their sources, or in situations where they become concentrated. Much, however, will depend upon the predisposition or susceptibility of persons exposed to them.

12. *B.* Certain maladies do not perpetuate themselves by effluvia or by an impalpable emanation, but by *the contact of the secretions formed in their course;* and these secretions will seldom induce disease unless they be inoculated, or come in contact with a mucous surface. Other secretions, particularly from diseased animals, when brought in contact even with the unabraded skin, will sometimes produce serious distempers. Instances of this fact are furnished by the malignant pustule, and by other maladies already noticed. The inoculation of putrid animal matters, and the bites of poisonous reptiles, infect or contaminate the whole frame in a sufficiently remarkable manner, the former agents producing a low, irritative, or adynamic state of fever; but the diseases thus produced seem incapable of propagating their kind, unless by the inoculation of morbid matters formed in their course, or taken from the body after death; and then the effects will probably vary with the previous state of health of the person thus infected, and with various concurrent circumstances.

13. iii. *Of the Third Class of Infectious Agents.* It is unnecessary to add any thing to the statement contained in the classification of these agents, which I have attempted. The impalpable emanations and consistent secretions of which they consist, produce specific forms of disease, whether they operate *directly* or by various *media*, or *fomites.* But, although the chief characters of these maladies are uniformly preserved, in all of them, during their transmission, yet several of them are much modified by concurrent causes, by the circumstances, or existing states, of the affected, and by endemic and epidemic influences.

14. II. Of the Proofs of Infection, *or the circumstances proving a disease to be capable of propagating its kind.* It has been asserted by some recent writers, that the doctrine of infection, by contact or otherwise, is a comparatively modern invention. These assertions have been made by

persons possessed neither of sufficient medical learning nor practical information, to attach any degree of importance to their opinions. It has been satisfactorily shown by Dr. Yeats in this country, by Dr. Marx in Germany, and Dr. Omodei in Italy, that the doctrine of contagion was recognized by the ancient Egyptians and Jews, by the Greeks and by the Romans: and that it was equally believed in during the middle ages, although the notions of many respecting it, even among professional writers, were often loose and inaccurate It is unnecessary to adduce proofs of the acquaintance of the ancients with contagion, as this has been done so satisfactorily by the writers just mentioned. Some evidence also on this subject will be found in the article Epidemic Influence. Indeed the matter would never have been questioned, had not commercial men, in order to remove some impediments in the way of their traffic, properly imposed for the public good, employed persons to write in favour of their interests; but with an ability and success quite commensurate with the truth and justice of their cause. The question, however, as lately agitated, is not so much the existence or non-existence of infection or contagion in any circumstances, and as respects all diseases, for proofs of the possession of these properties by certain maladies are so incontrovertible, as not to be doubted. It is principally with respect to the infectious nature of pestilential epidemics, as plague, yellow fever, and epidemic cholera, that the subject has created so much interest and discussion at the present day. When we consider the extent to which the dread of the importation of these maladies impedes commercial undertakings, in connection with the little consideration human life receives in the prosecution of commercial objects, it is not likely that the contingent importation of infection will operate in such a manner, as long to prevent attempts at the removal of existing salutary restrictions; although the *proofs* as to the existence of an infectious property in these distempers, are considered quite conclusive by all candid inquirers.

15. i. There are various circumstances which, singly or conjoined, *prove* a disease to be *truly infectious*, or capable of propagating itself. — 1st. The arrival in places which are healthy of persons from districts in which a disease is prevalent, and the spread of such disease soon afterwards in the previously healthy place. — 2dly. The extension of such disease in this place, in proportion to the intercourse between the affected and the healthy. — 3d. The greater prevalence of such disease amongst persons who devote themselves to its alleviation, as amongst medical attendants, nurses, and the friends of the sick. — 4th. The absence of any other cause to which the malady may be attributed, the soil, the climate, the season of the year, the weather, neither singly nor conjointly, serving to account for it. — 5thly. The immunity obtained by seclusion and by avoiding communication with the sick and those who have visited them, as well as by the careful exclusion of all substances which may have imbibed and retained the emanations from the affected. — 6thly. The success of measures taken to prevent the extension of the malady, as the early removal of the sick to places where communication with the healthy is prevented. Besides these, there are other proofs, which are even more conclusive. When we perceive the healthy become affected with a malady, soon after proximity to, or contact with, a person labouring under a similar malady, or after having been exposed to substances which have imbibed the effluvium from the sick, as bed and body-clothes, &c., the evidence of infection from these sources, although not amounting to complete certainty, yet nearly approaches it. Instances of contagion by *inoculation*, and by immediate or direct communication with the sick, are sufficiently numerous in respect of several maladies, and are familiar to all: and the evidence of infection by substances which have imbibed a morbid effluvium or secretion — by *fomites* — is not less strong, although it is in some cases not so conclusive, and hence it has been more frequently impugned. It has been satisfactorily shown to all candid minds, and numerous instances have occurred to my own observation, of a disease having been conveyed in the clothes of a second person, and communicated to a healthy individual. That this has occurred with respect to certain maladies acknowledgedly infectious, cannot be disputed by the most captious objector. The only questions admitting of doubt are, — to what diseases should this capability of propagation be extended: and for how long a period, and under what circumstances, may the infectious effluvium be thus retained and conveyed. Some answer to the first of these questions will be obtained by what is hereafter to be advanced; as to the second, it is impossible, from the nature of the subjects involved in it, to furnish precise information. There is every reason however to state, that the body-clothes or bedding, used by a person while sick of an infectious disease, may communicate the same malady several or even many months afterwards, if they have been shut up from the air; and I have known several instances of a disease being conveyed from the sick to the healthy, the person, who has been the medium of communication, having walked a distance of upwards of two miles in thus conveying it.

16. ii. *Of the media by which infectious agents are communicated to the healthy frame.*—*a*. The *miasms* or *mephitic vapours*, exhaled from the sources already enumerated, are evidently suspended, and rendered active, by the humidity of the atmosphere, in the situations in which they are disengaged: for it has been repeatedly shown, that these miasms are active in proportion to the grade of atmospheric humidity, and to the circumstances which augment that humidity. Their presence in the air brings them in contact with that part of the animal economy, presenting the greatest extent of surface, the greatest vascularity, and the freest communication with the circulating system. Although the atmosphere, aided by humidity and a moderate or high range of temperature, is the usual medium of infection, especially in respect of those maladies, which emit an offensive effluvium or emanation; yet there are other media which observation has shown to be not infrequent means of communication. Numerous substances imbibe, retain for a considerable time, and convey, the invisible or *infectious* emanations, as well as the palpable and *contagious* virus, or consistent secretions of the sick, and become media, by which infection is conveyed from one person or from one country to another, between

whom a greater or less distance is interposed. Of the various materials, which may thus be the means of transmitting infectious diseases, animal productions, particularly woollen and hairy substances, bedding and body-clothes, furs and feathers, have the greatest disposition to imbibe and to retain the morbid effluvium. The *length of time*, during which the morbid *seminium* may thus be retained and still be operative, has never been accurately determined. Probably the period varies with the disease from which it proceeds. There can be no doubt that it depends much on the exclusion of the atmosphere, and upon the temperature to which it has been exposed.

17. *b.* When infection is produced by substances which imbibe and retain the morbid effluvium or secretion, it does not arise from actual contact with the substance which is thus the medium of communication, unless it conveys a more or less consistent virus or secretion. The substance imbued with the morbid effluvium retains it whilst shut up from the air for a longer or shorter period, but more or less readily imparts it when exposed to the atmosphere, which now becomes the infecting medium. Even the clothes of an attendant upon a person labouring under an infectious disease, will retain the morbid emanation much longer than is generally supposed. There are few who will dispute the fact of infectious diseases being often communicated in the clothes of medical men, and other attendants on the sick. I have known several instances of small-pox, puerperal fever, and pestilential cholera, being thus propagated. I was recently called to the wife of a physician in the most malignant form of small-pox, conveyed to her by her husband whilst he was in attendance on a case of this disease at a considerable distance from his own residence. Sometime ago I was requested by a practitioner in extensive midwifery practice, to see a case of true puerperal fever. He had, within a few days, lost five patients from this malady. I asked him to consider whether he might not have been the medium of communicating the disease to most of them. Before my attendance on this case terminated, he expressed his conviction that he had communicated the malady to four at least of the six. Similar instances have been mentioned to me by other obstetric practitioners. — I am convinced of having conveyed the infection of pestilential cholera in my clothes, in two instances.

18. *c.* The infection or contamination caused by ingesta, or by substances used as food and drink, is generally not so rapid in its progress or so dangerous, as when the infectious agent acts through the medium of the air upon the lungs, or when it is conveyed into the system by inoculation. Some, however, of the more active poisons may be said to furnish exceptions to this law, but they hardly come within the present category. Unwholesome articles of food generally infect the system by a succession of morbid changes requiring more or less time for their developement; and much of their baneful effects is counteracted by the vital influence and resistance of the stomach, and by the changes produced by the gastric juices. Still, in proportion to the injurious nature of the substances received into the stomach, will the organic nerves be morbidly impressed, or the chyle and blood contaminated, by the noxious fluids or matters absorbed from the digestive canal, or both kinds of disorder be induced, the effects varying with the activity of the injurious agent, and the duration or repetition of its operation. A morbid emanation, which would produce an immediate effect upon being inspired with the air, will be quite inoperative when received into the stomach mixed with the saliva: and a morbid secretion or virus, which would be followed by the most dangerous results when inserted under the cuticle, may be swallowed with impunity. The matter of small-pox will produce no effect when conveyed into the stomach of a person, who will be readily infected by the effluvium or the virus of the disease; and the same obtains with respect to other contagious maladies. The immunity from the one medium of communication, and the ready operation of the others, are accounted for by the structure and functions of the organs and parts to which the infecting agent is applied. From this the ignorance of pathological principles displayed in the silly and disgusting attempts to prove certain maladies to be non-infectious or non-contagious, by tasting or swallowing the secretions to which they give rise, will be sufficiently evident.

19. *d.* In cases of general infection of the frame, resulting from a local source of contamination existing in the body itself, the media of infection may be readily inferred. Cancerous, sanious, or purulent matters may be formed in a part of the body; and as long as nervous power, and vital resistance are not materially depressed, either the mischief is limited, or attempts are made at throwing it off; but as the system becomes weakened, the disease extends, absorption takes place, the morbid matter carried into the circulating vessels vitiates the blood; and hence arise imperfect and disordered secretion and excretion, insufficient digestion and assimilation, and a general infection of the fluids and solids of the body.

20. *e.* The *effluvia* or *emanations* from a number of persons even in health, shut up in a confined space, or in ill-ventilated apartments — from the lower animals similarly circumstanced — from the sick in crowded wards, &c. — and from those with infectious or contagious diseases, generally operate almost entirely through the medium of the atmosphere, and with an activity in proportion to the humidity of the air, and to the accumulation of the noxious effluvium, relatively to the susceptibility or degree of predisposition of those exposed to its action. But as all the emanations from the sick consist in a great part of watery vapour, even a dry air, if it be not quickly renewed, will at length become so moist, as to be soon as injurious as that which was already humid. Moisture favours the developement of infectious emanations, increases the activity of all of them, and heightens the predisposition of persons exposed to them. Experience has shown that the emanations from the sick seldom infect the healthy, whilst the air is dry, cool, and freely renewed; that infectious diseases seldom occur or appear only sporadically in such circumstances; and that these diseases generally prevail or become epidemic in warm, humid, and stagnant states of the atmosphere. The crowded wards of hospitals, ships of war and transports, generally continue healthy, as long as dryness and freshness of the air are preserved. But as soon as these requisites to health are neglected; when the floors of the former, or the decks

of the latter are frequently washed, so as to render the air moist; the emanations from the healthy as well as from the sick readily accumulate or acquire activity. Fevers, dysentery, scurvy, erysipelas, and even hospital gangrene or phagedenic ulceration and phlebitis, will thus be developed or rendered prevalent.

21. *f*. Although there are various agents which infect the body in a certain determinate mode or medium, — as typhoid and exanthematous fevers, by the emanations proceeding from those affected by them floating in the air, — syphilis, by contact, — rabies, by inoculation, &c., — yet there are others, as arranged above, which operate in more than one, or by all these modes. There are some sources of infection respecting which we are still insufficiently informed as to the several modes or media of their action. A person on opening a recent body that has died of peritonitis, may have a pustular or erysipelatous inflammation of the skin of his hands, with smart fever produced, although there has been neither puncture nor abrasion of the cuticle, and if either has existed his life will be placed in the utmost jeopardy. Mr. Kiernan informs me that he has even seen, from the inspection of cases of this description, very severe constitutional disorder produced in those who had never touched the bodies which were examined. In these instances, the effluvium exhaled from the peritoneal cavity or from other internal parts, upon first exposing them, must have infected the system.

22. III. The Effects, or the Diseases, produced by Infection vary with the sources and modes of infection, with the concentration or intensity of the infectious agents, and with the predisposition or susceptibility of the persons exposed to them. Certain of these agents produce a determinate effect, or a specific form of disease, particularly those comprised under the third class. — *A*. It has been supposed, that the terrestrial miasms or mephitic vapours, emitted by marshes and other sources of malaria, produce only intermittent and remittent fevers. Some writers, however, have contended that true yellow fever, and even plague, also spring from these sources, aided by the influence of high ranges of temperature and an epidemic state of the air. That terrestrial miasms are capable of producing, under these circumstances, pernicious or malignant forms of fever, which assume either a remittent or a continued type, according to concurring causes and the state of the patient, I will readily admit; but that they occasion either true yellow fever or plague, is an assumption founded on preconceived and fallacious views, which every circumstance connected with the origin and pathological relations of these maladies fully disprove. (See Art. Pestilences.)

23. That malaria, however, produces a wider range of diseased action, than has been long supposed, I will allow; for I agree with much that has been advanced by Dr. Macculloch on this subject, and believe, that the less concentrated states of terrestrial exhalation, particularly in low grades of atmospheric temperature, will give rise to several diseases usually imputed to other causes, — as to catarrhs or catarrhal fevers, rheumatism, neuralgic affections, sciatica, obstructions of glandular organs and premature decay. When terrestrial exhalations are concentrated or rendered more active by a warm and humid air, bilious inflammatory remittents, gastric or mucous fevers, cholera, dysentery, and visceral diseases will frequently result, according to the existing disposition or states of those exposed to them.

24. *B*. The contaminating effects of unwholesome kinds of food and drink frequently declare themselves in specific forms and modes. Ergotism, gangrenous ergotism, scurvy, scorbutic dysentery, adynamic dysentery, &c., are illustrations of this. On many occasions, however, the ingesta constitute only one of the sources of infection, or other causes concur with this in producing the effect. Mucous, gastric, and putro-adynamic fevers and dysenteries, even when chiefly occasioned by septic or diseased articles of food, or by water containing putrid animal matter, are often aided in their appearance by additional causes: when foul water is concerned in the production of septic or adynamic maladies, animal or vegetable exhalations, or both, and unwholesome food, frequently co-operate with it. The fevers and dysenteries so generally developed in armies, in besieged towns, &c., seldom proceed from a single source of contamination only. When they assume highly infectious and typhoid forms, it will generally be found, that putrid and impure food and water, exhalations from animal exuviæ, and from the surrounding soil containing numerous dead bodies imperfectly covered with the earth, famine, fatigue, and the depressing passions, first contaminate the frame; and that the exhalations from persons confined in close places, and from those first affected by those causes, heighten still further the morbid effects, until a most malignant malady is produced. It is extremely probable, that the air of a place thus circumstanced, and especially the moisture floating in it, may become so saturated with noxious effluvia derived from these sources, as to assume a pestilential character; the infection extending to nearly all who breathe it, but becoming less remarkable, as the distance from the focus of infection increases. Hence it is, that in large, crowded, or populous cities, particularly in seasons when the temperature is high and the air humid, and is already contaminated by the circumstances which necessarily attach to them, and especially by exhalations from animal exuviæ and burying places, the infectious emanations from the persons first attacked by the resulting febrile maladies heighten the existing aerial contamination, produce a more marked effect, and more readily spread the malady in these places than in those differently circumstanced. During the pestilence in Rome, during 262 and 263, the air is stated by Eusebius and Cedrenus to have been so contaminated by the emanations from the sick and dead, that the dew which fell in the mornings and evenings presented a sanious or putrid appearance on the surface of objects. It is chiefly owing to this circumstance that when an infectious disease becomes very destructive, or assumes a pestilential form in crowded cities, it seldom spreads extensively in districts far removed from them, although it is generally communicated to a greater or less extent to the healthy, by those who have left the source of infection, and by *fomites;* for the circumstances favourable to the infection are there wanting.

25. That continued fevers of a low, adynamic, typhoid, or putro-adynamic character, dysentery, erysipelas, hospital gangrene, phlebitis, puerperal fever, diffusive or disorganizing inflammation of cellular parts, and the diseases enumerated in

the Classification, as the results of the various kinds of contaminating or infectious agents comprised under the *second class* of my arrangement, arise from these sources, may appear paradoxical to many. But an extensive examination into the subject will show that animal affluvia produce those diversified effects, according to the nature of the effluvia, to concurrent circumstances, and to the peculiarities of the persons affected; and that the resulting maladies perpetuate their kinds, when the conditions favouring this occurrence are present.— That morbid actions, often of a most dangerous and malignant kind, follow the inoculation of morbid secretions and septic animal matters, although these secretions may not have been taken from a person labouring under a disease generally recognised as being infectious or contagious, has been evinced on various occasions, and shown even by experiments. Much, however, in these cases, depends upon the health of the persons who may be thus inoculated. The general persuasion that diseases usually recognised as contagious, alone can be communicated in this way, is by no means correct, for the range of infection by inoculation is much wider. Indeed, I consider it as a pathological principle, that morbid secretions and septic animal matters, from whatever source, will, if applied to an abraded or divided living surface, or allowed to remain in contact with a mucous, or even with the external surface, give rise to some one of the maladies assigned in the Classification to this order of agents; and that the morbid matters generated by these maladies will produce similar effects in others, if applied in the same way, provided that a predisposition to the infection exists. This predisposition manifestly consists of depressed constitutional power, and weakened vital resistance, often in connection with disorder of the digestive organs, and sometimes with general cachexia.

26. The maladies which are produced by the third class of agents, or by *specific infections and contagions*, are, with few exceptions, so generally recognised as the results of the operation of these agents, as to require no remark. The diseases that may be viewed as exceptions to this mode of origin by some writers, whose powers of argumentation and knowledge of the sources and course of morbid actions have secured for them but slight reputation with competent judges, cannot be more particularly alluded to in connection with their sources at this place.

27. C. *The diseases produced by infectious or contagious agents may be modified or aggravated, by superadded or consecutive causes.* — This is especially the case with those febrile maladies, which arise from endemic sources, and from animal effluvia. The emanations from the sick of these maladies, if allowed to accumulate around the patient, particularly where several are confined in ill-ventilated places, will aggravate the disease, impart to it new characters, and an infectious atmosphere may be thus generated capable of producing a modified, or even a different, but generally a much more malignant, malady, than that which originally existed. The aggravation of diseases by the accumulation of the emanations from the sick, or from any other source productive of infection, obtains generally. On the other hand, free ventilation exerts a beneficial influence, and prevents the contamination of the circulating fluids, as well as the depression of vital power that would otherwise result.

28. Humidity and dryness of the atmosphere have much influence upon inflectious maladies. The former not only gives activity to infectious agents, but also aggravates their effects, and predisposes the human frame to their operation. Infection is, in the first instance, thereby favoured and accelerated; and it is subsequently aggravated in the whole progress of its resulting phenomena. Dryness of the air, on the other hand, either prevents infection, or delays the development of its effects. The depressing passions, fear, and whatever lowers vital energy, are most influential and powerful concurring and aggravating causes of infection, both before it is fully developed, and during the course of its effects.

29. IV. Of the Period which elapses from the first Impression or Operation of Infectious Agents, till the Development of their Effects.—The period which elapses from exposure to the agents of infection until the development of their effects, varies remarkably in its duration, as respects not only different infectious maladies, but also different persons exposed to the impression of the same agent. This period has been denominated the *latent* period and the period of *incubation* by French pathologists. I have, in the articles Disease and Fever, called it the *formative*, *premonitory*, or *precursory* stage, or the period of *premonition*, because the changes taking place in the constitution during this stage are productive of the subsequent phenomena, and are generally manifested by certain symptoms, attention to which may often prove of essential service in the prevention or treatment of the consecutive disease. The *duration* of this period has been differently stated by different writers, as respects almost every infectious disease. In some of these diseases it is quite indeterminate; but, as regards others, it is more uniform. — *a.* The precursory period of diseases which proceed from terrestrial or paludal emanations, varies from six or seven days, to as many months. From data obtained by Dr. Gregory, it would appear, that of a number of persons exposed to malaria proceeding from the same source at a precise period, thirteen days were the shortest, and thirty-nine days the longest, duration of this period; and that in the greatest number, agues and remittents were developed on the 20th and 22d days after infection. In some cases, where I had an opportunity of observing this period, remittent fever appeared in some six or seven days, and in others a few days later, after exposure to the cause. Dr. Marsh infers, from numerous instances furnished him in Ireland, that this period may be protracted to eight or nine months.

30. *b.* The duration of the formative period in *typhoid fevers* has not been observed with sufficient precision. Dr. Haygarth declared that the minimum was seven days, and the maximum seventy-two days. Dr. Bancroft inferred the minimum period to be thirteen days; but the observations of Sir W. Burnett, Dr. Marsh, and others, prove that the period is much shorter. Dr. Marsh, indeed, endeavours to show that the febrile rigor may succeed almost immediately to the exposure to the infectious effluvium. But in many of the instances which he adduces, there is every reason to suppose that a previous exposure to infection had occurred, *that* which seemed to have made the morbid impression having only been a consecutive or determining cause of the disease. Dr. Williams thinks that this period may extend

from a few hours to a few weeks, or perhaps to a few months. I have stated, that it may not continue beyond twenty-four hours in the worst forms of these fevers, and that the most common duration is from three to fourteeen days. This agrees with some observations which I have lately had an opportunity of making. Dr. GREGORY considers that the medium duration of this period in these fevers is ten days.

31, *c*. The precursory or formative period in *measles* generally continues from seven or eight, to fifteen or twenty days. Dr. BATEMAN states it to vary from ten to fifteen days. Dr. GREGORY from eight to twenty-one days. Dr. WILLIAMS remarks, that the time which this poison might remain latent has been determined to vary from ten to sixteen days. This agrees with the observations of Dr. HEBERDEN and of Dr. HUE. — Dr. HOME, who first tried the inoculation of measles, observed that the eruption appeared on the sixth day afterwards. The experiments of inoculation in measles by VOGEL, MONRO, TISSOT, CULLEN, SPERANZA, and others, furnish no additional information on this subject.—M. GUERSENT is of opinion that *hooping-cough* appears five or six days after infection. I have stated that it is generally from five to nine days, or even longer, after exposure to infection, that the cough commences.

32. *d*. In *scarlet fever*, the formative period varies in duration from one, to twenty or twenty-five days. Dr. WILLIAMS considers that it continues from a few hours to about ten days. Dr. BINNS assigns two days as the shortest period; Dr. WITHERING three or four days; and Dr. HEBERDEN and Dr. FRANK five days; Dr. BLACKBURN believes that the period varies from four to seven days; and Dr. WILLAN, that it rarely continues longer than six days. The duration of this period depends much on the character of the epidemic. Dr. MATON observed, in one epidemic, this stage prolonged to twenty-five or twenty-six days. In a most malignant case of the disease, which I recently attended, infection was produced by some of the secretion from the mouth of a patient having been conveyed by the hand to the glans penis of a different person. Most violent asthenic inflammation and excoriation extended thence over the genitals, to the groins, abdomen, and inside of the thighs.

33. *e*. In *small-pox*, the duration of the precursory period varies from six, to twenty or twenty-one days. When the disease appears in the natural way, or by the medium of the air, Dr. GREGORY thinks twelve days to be then the usual period.— When small-pox is *inoculated*, the eruptive fever commences seven days afterwards, but it may be delayed a day or two longer. Indeed, cases occasionally appear, in which this period is either shorter or longer than that now stated.

34. *f*. In *plague*, the precursory period may be very short. Sir BROOKE FAULKNER has mentioned some cases, in which the attack seemed to follow almost immediately, or within a few hours, upon the impression of the infectious effluvium. Some writers have stated this period to vary from two to fifteen days, five days being its medium duration. The disease has occurred on the fourth day after its inoculation. — *True yellow fever* usually appears from two to twelve days after infection; but it may take place in a few hours after the impression of the morbid effluvium, when concentrated. — In *pestilential cholera*, the precursory period varies from one to six days, according to my own observations; and this agrees with the statements of others. This period may, however, be somewhat shorter or much longer than now stated. — True or *malignant puerperal fever* usually occurs from one to five days after infection, but it may be delayed beyond this period.

35. *g*. The time that the infection of *erysipelas* takes to develope itself has not been accurately determined. Dr. WILLIAMS thinks that it may vary from two to fourteen days. In the instance above alluded to, and in some others that I have seen, the period was not longer than thirty-six hours. In the various forms of infection proceeding from the inoculation of morbid matters, or from injuries during the dissection of recent or of putrid bodies, the constitutional effects are usually manifested within three days, sometimes in the course of a few hours and very rarely after four days.

36. *h*. The morbid secretions productive of the various forms of *venereal disease* evince their effects at various periods, between one or two days and two months. The *gonorrhœal* affection generally appears much earlier than the *syphilitic*; the former most frequently showing itself from two or three days to ten or twelve, — the latter from six or seven days to two or three weeks.

37. *i*. The virus of *rabies* takes a longer time in developing itself, than any other infectious agent. There can be no doubt of the precursory period of this malady being sometimes prolonged much beyond what is generally believed, although the very long intervals stated to have elapsed in some instances are quite apocryphal. There are, however, well attested cases of two years having passed from the insertion of the virus until the appearance of the malady. Instances of from four to twelve months having thus elapsed are by no means rare. The *shortest* period of premonition in rabies may be stated to be twenty-one days. In the greatest number of cases, the disease appeared from thirty-one to sixty-three days after the inoculation of the morbid secretion.

38. *After the first impression* of an infectious agent, until the development of its effects, or during the whole of this percursory period, the change produced in the economy presents certain general features, which are of the utmost importance to recognise, and to estimate aright. These changes are not materially different in the different infectious maladies: they vary, however, in intensity as much as in duration; but they often possess very nearly the same characters, which always manifest the production of a more or less noxious effect upon the economy — as depression of nervous and mental energy, and of all the manifestations of life. These manifestations are, however, severally depressed in different degrees, in different maladies, during this period; and certain organs experience this effect more than others, as well as betray a specific or peculiar mode of affection according to the nature of the infectious agent. In those distempers which proceed from the more intense or concentrated agents, and in which the precursory period is short and severe, the effect produced upon the nervous system is generally immediate and remarkable. Not only are the physical functions depressed and embarrassed, but the mental and moral powers are remarkably weakened or nearly

annihilated. In true yellow fever, in plague, and puerperal fever, the patients become indifferent to their fate, and care not for the most intimate relations. The sensibilities are not merely blunted, they are almost destroyed; and a similar effect is observed in many other infectious maladies, although not in so remarkable a degree. Much of the calmness displayed by persons in this, as well as in the more advanced stages of these diseases, results not so much from a philosophical or stoical suppression of the sentiments and emotions, as from a generally impaired power of the organic nervous system, and a consequent impairment or loss of the general sensibility, and of the cerebral energy. Hence the physical change is often such, that those parts of the frame which are the most intimately related to the manifestations of mind, or which either minister to them or are their instruments, are more or less incapable of discharging their offices.

39. V. THE SYMPTOMS OR INDICATIONS OF INFECTION vary remarkably in the rapidity of their production, in their intensity, and in their numbers, forms, and modes of grouping. But it is of importance that they should be recognised by the physician. When the infecting agent is intense, as when a concentrated animal effluvium or an accumulated emanation from the bodies of the sick is directed upon a susceptible person, then the effect may be as instantaneous as electricity, as well as most intense. In some rare cases of this kind, as in plague, and in other pestilential maladies, life may be destroyed in a few hours by the morbid impression which it has been quite incapable of opposing, and against which it has been unable to react. I have seen the emanations from typhoid fever, from yellow fever, and from pestilential cholera, immediately produce sickness, vomiting, pain, sinking and anxiety at the epigastrium, faintness, oppression at the chest, remarkably weak pulse, headach, and general vital depression, with pale countenance and shrunk surface; and from these the patient has never rallied, the symptoms increasing in severity, and others supervening, until death has occurred in a very few hours.

40. Where the agents are less active or less concentrated, or where the predisposition is not so great, a much longer time is taken in the development of the changes constituting the precursory period of infectious maladies; and in the majority of those, the vital powers resist the further progress of these changes in that particular direction, and a salutary *reaction* is established. In many instances, little or no complaint is made after exposure to infectious agents, although a morbid impression has actually been made by them. In some only a slight *malaise*, or an indefinite feeling of indisposition, indicative of depression of vital power, only is complained of. In others, the depression is much more manifest, and is attended with a weak or slow pulse, or with unusual acceleration of the pulse upon slight exertion; with chills, alternating with flushings or heat of skin, depression of spirits, and pallor of the countenance, great weakness of the joints, and impaired power of the digestive, secreting, and excreting functions. When infection is produced through the medium of the respiratory organs, the earliest effect that is observed is a feeling of constriction or oppression in the chest, or at the præcordia and epigastrium, attended by frequent sighing, gaping, forced and deep inspirations, and by uneasy sinking, depression, or nausea, and sometimes by pain at the stomach, and by vomiting. The natural and acquired appetites and desires are diminished or nearly abolished; nausea is readily excited by food; and the bowels are either costive or relaxed, or easily acted upon by purgatives. All the organic functions are impaired, and the sexual desire suppressed. The patient feels debilitated and fatigued; complains of headach, vertigo, or confusion of ideas; is morose, low spirited, sluggish, indolent, or incapable of exertion, or of directing his attention long to any object: he readily perspires, and his breathing becomes short and quick, on the least exertion. His sleep is unsound and unrefreshing, and he wakens, complaining of lassitude or of pains in his back and limbs. All the cerebro-spinal functions are weakened or disordered. The countenance and skin are unusually pale, sallow, or unhealthy; more rarely red; the eyes are languid and deficient in brilliancy; the breath is fœtid or cool; and the tongue is often loaded — occasionally red or flabby. The urine is sometimes pale and copious; and the cutaneous surface is dry, cool, and harsh or constricted. These symptoms are sometimes so slight as to escape particular attention, and are often insufficient to induce the patient to confine himself. They are frequently much more intense, without being different as to kind; their intensity increasing more or less rapidly, until a sensation of cold running down the back, with formication, chills, or rigors, supervene, indicating the approaching development of the malady.

41. When infection is produced by inoculation, the more immediate effects are somewhat differently manifested, according to the nature of the morbific agent; and, in those maladies which require a long precursory period for their full formation, several of the above symptoms are either altogether wanting, or are so slight as to escape detection. In some instances, persons actually infected may complain but little, or may experience merely slight debility, inaptitude for exertion, various dyspeptic symptoms, and depression of spirits. At last some consecutive or determining influence comes in operation, and the infectious agent, thus reinforced, soon produces its full effects.

42. In some instances, the premonitory period is characterised by remarkable mental depression, by a reserved manner, and by the anticipation of an approaching calamity or even death. When a person who has been exposed to infectious agents, particularly those which are liable to become epidemic, is possessed with the idea of his impending dissolution, this unfortunate termination generally takes place. This symptom, more, perhaps, than any other, indicates a dangerous functional lesion of the nervous system.

43. *There are various circumstances which favour or retard the development of infection.*— Several of them have been already noticed (§ 27.). Many of those which favour the development of infection, not only render the consequent disease much more severe than it would otherwise have been, but also complicate that disease, and impart to it a fatal tendency. Exposure to wet and cold, unpleasant or distressing intelligence, a debauch, excessive fatigue, and exhaustion from

any cause, during the precursory period, will not only accelerate the effects of infectious agents, but also give rise to inflammation, or congestion, or obstruction of some vital organ. This often occurs in measles, scarlet and typhoid fevers, hooping-cough, small-pox, &c. — Dr. MARSH justly remarks, that a principal reason of the danger and fatality of fever amongst medical practitioners is, that, during the latent period, they make an effort day after day to discharge their laborious duties, until at length they are reluctantly compelled to yield; the disease having gathered strength in the same proportion as they have made strong, but ineffectual, efforts to resist it. A slight illness may be prevented by a strong effort, but a severe one is thereby greatly, often fatally, aggravated, and this is not the case merely in respect of fever, but of every malady produced by infection. The circumstances which retard or prevent the development of infection will be considered hereafter, when the pathological views here stated will be applied to practical purposes.

44. VI. THE MANNER IN WHICH INFECTIONS AND CONTAGIONS INVADE THE ECONOMY, AND THEIR IMMEDIATE AND DIRECT EFFECTS, have lately excited some discussion. And let it not be supposed that the subject is devoid of importance. For correct views respecting it will lead to the adoption of means for the protection of the system, both at the time of exposure and in the period which more immediately follows it, that will often prove successful in counteracting its earlier effects, or in rendering the course of the disease more mild. —*A*. It is now about twenty years since I endeavoured to show, by anatomical connections, by functional relations, and by intimate observation of the effects produced by the more energetic morbific agents, that their impression is first made chiefly upon *the organic nervous system*, although the change or effect thereby produced, necessarily soon extends to the vascular system, and even to the circulating fluids; and that this takes place when the infectious agent is inserted into a wound, as well as when it is inhaled into the lungs with the air. At the same time I endeavoured to show that certain agents may more especially affect the circulation by their imbibition or absorption into the blood. This is more especially the case when the infectious agent is received into the alimentary canal with the solid or fluid ingesta, or when it consists of morbid secretions formed in an organ or part admitting of their passage into the circulation. There can be no doubt of the respiratory organs being generally immediately affected by all those agents which are conveyed through the medium of the atmosphere. The cutaneous surface is sufficiently protected from the operation of the impalpable emanations constituting the most common and the most numerous infectious agents. The digestive mucous membrane, although less guarded than the cutaneous surface, is still less exposed than it to their action. It is chiefly, therefore, through the medium of the respiratory surfaces that these agents make their direct impression. On these surfaces the air may be said to undergo a process of digestion — certain elements or portions of it entering in the circulation, combining for a time with the circulating fluids, and promoting their perfect sanguifaction and assimilation; and from those surfaces certain gaseous fluids and elementary principles are given off, which have served their purposes in the economy. There is every reason to infer, that during this process, noxious matters floating in the air, or dissolved in the moisture of the atmosphere, produce a morbid impression upon the nerves supplying these surfaces, and upon the respiratory organs generally; and that this impression is more or less rapidly transmitted throughout the organic nervous system, — the other organs and general systems of the body, more immediately dependent upon this system, soon manifesting the effects thus produced. At the same time, the noxious emanations, thus conveyed to the lungs in the course of the respiratory functions, most probably affect the condition of the circulating organs and of the blood itself, — both these orders of effects taking place co-ordinately, or either of them in a more or less special manner. That certain infectious agents impress the organic nervous system directly and chiefly, is shown by the suddenness of the effects; by the sensations experienced at the time of exposure to those agents, especially to the emanations conveyed in the air; by the sense of constriction and oppression produced in the chest; by the frequent and forcible efforts made to dilate or fill the lungs, as if the impression of the infectious emanation had impaired the vital resiliency of these organs; by the offensive odour frequently perceived at the time of infection; by the sickness, fear, and alarm instantly afterwards felt; and by the other phenomena already enumerated.

45. *B.* Next to the impression and change in the nervous system of organic life, the alterations in *the circulating organs and fluids*, consequent upon infection, deserve attention. When infectious effluvia are inhaled into the lungs, the weak action of the heart soon indicates the depression of this system. The impulse of the heart is feeble, slow, or irregular, and oppressed. The pulse is weak, soft, compressible, or small — sometimes irregular. It indicates a want of tone; and when the infectious agent has acted with much intensity, absolutely or relatively, the sensation imparted by the artery suggests the idea that the contractility of the coats of the vessel is much impaired. From this defect of the contractility and tone of the blood-vessels arises, during the precursory period of diseases produced by the more energetic infections, the remarkable tendency to congestion of those parts of the circulating system, and of those vessels, which are the most removed from the influence of the heart's action. Hence the congestions of the spleen, of the portal vessels and hepatic veins, and of the sinuses within the cranium; and hence the retarded circulation through the lungs, and the fulness of the auricles and sinuses of the heart, giving rise to the sense of oppression at the præcordia and in the chest, and to the frequent sighing and forced inspirations attending this stage of disorder.

46. The effects produced by infection on the *blood* are not so immediately, or at least not so sensibly, evinced, as those induced in the functions of organs actuated by the organic nervous system. The blood may, however, be affected without the alteration being perceptible to the senses; and changes in the appearances of this fluid are usually visible, before alterations in its constitution can be detected by chemical tests or analysis. The pathological conditions of the blood during the earlier

stages of the diseases consequent upon infection have not been sufficiently observed, and far less satisfactorily investigated. Those which have been described are the results of prolonged or intense morbid action, probably aided in some cases by treatment and regimen. I have given, in the article Blood, a full view of those alterations, and explained their sources. But the subject, with all its interest and importance, has not since received any further elucidation. The state of vital depression, immediately produced by infectious agents, generally precludes the abstraction of blood, and the opportunity of observing its states. I have, however, seen some instances of blood having been taken from a vein during this state, owing to a misinterpretation of the headach, pain at the epigastrium, and oppression at the chest then complained of, and to the epidemic disposition to vascular depletion so prevalent amongst practitioners, excited and promoted as this disposition was by inexperienced writers, who inflicted their crudities and inanities upon the public, as well as upon the profession, soon after the commencement of the present century. In most of these cases the blood flowed with difficulty, was of a very deep or dark colour, and produced syncope or great depression upon the loss of a few ounces. It coagulated rapidly, and separated into a very dark, large, and soft coagulum, which sunk in the serum; this latter being small in proportion to the clot. In some instances the separation was very imperfect, the coagulum being gelatinous; and occasionally no separation took place, particularly when the powers of life were remarkably depressed. The blood taken at the commencement of the cold stage of agues often presents the same appearances, but generally in a less degree. These appearances indicate rather the vital conditions of this fluid derived from the organic nervous system supplying the vascular system and vital organs, than any change in its chemical constitution. It is not probable that the *hæmatosine* is materially altered, or that the saline ingredients and albumen have undergone any diminution, as the circumstances upon which these appearances depend have not been sufficiently long in operation to produce these effects. The *fibrine* is, however, changed or diminished; this substance evincing, by its attraction and cohesion, the state of vital or nervous power. When the fibrine contracts slowly, firmly, and so as to form a firm clot, and allow the free separation of the serum, or to give rise to a buffy or cupped surface of the coagulum, the nervous and vital powers are unimpaired, and vascular action is increased, and generally increased in proportion as this state of the coagulum becomes more remarkable. When, on the other hand, the fibrine adheres quickly, but imperfectly; when the attraction between its molecules is weak, and consequently, when either no coagulum is formed, the blood assuming a gelatinous consistence as it cools, or when the coagulum is loose and soft, with merely a slight separation of the serum, this latter either surrounding it in a small quantity, or partially, or altogether covering it, the constitutional powers may be considered as greatly reduced; and, although the circulation may be accelerated, its tone and energy are much impaired, the vital contractility of the coats of the vessels upon their contents presenting a weak *antagonism* to the action of the heart.

47. The occasions on which the blood seems to be more immediately contaminated by infectious agents, are, first, when a specific virus or morbid secretion is inserted into a wound, or beneath the cuticle; and secondly, when putrid or septic matters are similarly applied. The period which elapses between the inoculation of a specific virus, and the development of the constitutional affection, however, by no means shows that the immediate operation is upon the blood, and that this period is required for the production of morbid changes in it. If we examine the subject closely, we can arrive at this conclusion only, — that the morbid matter affects first the vital conditions and actions, and ultimately the intimate organisation of the part to which it is applied — converting the appearances and sensible properties of the part to states somewhat similar to those characterising itself; and that the contamination thus produced, soon extends, either by its immediat effects upon the organic nerves supplying the vessels of the part, and consecutively on the blood or by the imbibition or absorption of the morbid matter, or by both these channels, to the whole body, affecting more or less the blood, the secretions, and the soft solids. That the organic nervous system is the chief channel by which the first change induced in the part is communicated to the whole body, is shown by the circumstance of the constitutional effect being frequently as great whilst the local change is slight, as afterwards when it has become fully developed. Although the precise channel of primary infection cannot easily be demonstrated in cases of infection by inoculation, yet the ultimate effects, as respects both the solids and fluids, are sufficiently apparent. The facts and illustrations contained in the articles Blood (§110. *et seq.*), and Fever (§18.526.), render further remark on this topic almost unnecessary. That the blood undergoes, at an earlier or later period of most infectious diseases, a remarkable change as respects its appearances and sensible properties, is sufficiently established. In what the chemical or intimate change may consist, has not been shown by analysis. There can be no doubt, however, that in the advanced progress of some of these maladies, the saline principles of the blood are either diminished in quantity or altered in their combinations, as shown by Dr. Stevens. Indeed, this may be considered as a necessary consequence of the abstraction, during the disease, of the usual saline substances contained in the food. When the quantity of *chloride of sodium* used by an individual in the twenty four hours is considered, in connection with the fact that the whole of it passes into the circulation, we must expect a remarkable diminution of this salt, or of its base, in the blood of persons who have been but a few days affected by febrile or infectious maladies. The earliest changes, however, produced upon the blood are manifestly those of its vital conditions.

48. It is very reasonable to suppose that the influence exerted by the organic nervous system upon the circulating organs and vessels throughout their whole extent, and thence upon the contents of these vessels, will alter the appearances and conditions of these contents, as itself becomes altered by the influence of infectious agents; and that the effect thus produced upon the circulating fluids will reciprocate the morbid affection, and heighten disorder in the system more immediately

and directly impressed, — that, in short, nervous influence, which first experiences the morbid change, in communicating this change to the vascular system and circulating fluids, soon undergoes a further alteration, owing to the changes it has itself produced in these fluids. In some instances, however, and especially when putrid matters are applied to a wound, a more rapid contamination of the circulating fluids may be inferred. When these matters, or when morbid secretions, or blood in an advanced period of malignant or putrid diseases, are injected into the circulation, it is but reasonable to infer that the effects will be more immediate, and that they will be in most respects similar to the morbid conditions characterising the advanced stages of the malignant or putro-adynamic maladies produced by self-perpetuating infections or contagions. The interesting experiments of GASPARD, MAJENDIE, LEURET, and HAMMOND have fully established the truth of these inferences, as shown in the article just referred to.

49. *C.* The morbid impression made upon the organic nervous system, and the change induced upon the circulating organs, by infectious agents, necessarily *affect the secretions and excretions.* As the secreting and excreting organs are actuated chiefly by the organic nervous system, and as the vital manifestations of this system are remarkably depressed by infectious agents, the functions of these organs must consequently be more or less impaired soon after infection. It is chiefly owing to this circumstance, that the blood becomes altered in the progress of infectious diseases. In the article already noticed, I have fully shown that the imperfect performance of the functions of depuration is a chief cause of the morbid states of the blood; and that, as these functions are impaired in proportion as vital power is diminished, so must the secretions and excretions be disordered both in the early and in the advanced stages of infectious maladies. In the former of these stages, even the period of premonition, the disorder of these functions is often manifest, but they are diminished rather than vitiated. In the advanced stages, they are prominently vitiated as well as diminished; and sometimes, even when the vitiation is most remarkable, they are sufficiently abundant or even remarkably copious.

50. *D.* The *alterations produced in the soft solids by infection* are the latest in the procession of the consequent morbid phenomena, and vary remarkably with the nature of the infectious agent. Some of those agents produce certain determinate or specific effects upon the tissues. Thus the effluvium of small-pox affects the skin and mucous surfaces especially; — that of scarlet fever, the throat, digestive mucous surface, skin, and the membranes of the brain; — that of measles, the respiratory and cutaneous surfaces, &c.; — that of plague, the lymphatic system and glandular organs; — that of erysipelas, the integuments and cellular tissue; — that of syphilis, the absorbent glands, the periosteum, the skin, bones, and joints; and so on, as respects most kinds of infectious diseases. — These alterations are, however, much modified, or additional lesions are developed, by consecutive changes or influences; by the temperament, predisposition, or previous disorder of the patient; or even by the treatment, — as when certain complications appear from these or other circumstances, at the commencement, or during the course, of infectious fevers. Amongst the changes induced in the soft solids by infectious agents, the most important, and evidently the most intimately dependent upon the state of vital manifestation and the conditions of the circulating and secreted fluids, are the discolouration and the softening of membranous and parenchymatous structures. This discolouration and softening, as observed soon after death, are perfectly independent of incipient dissolution of the tissues, and are generally great in proportion as the infectious or contagious nature of the agent is remarkable. The general loss of the vital cohesion of the tissues is often so great, that even the most firm and coherent structures are torn with ease; the substance of the heart, and muscular parts, also participating in the change. (See art. FEVERS, § 527.)

51. VII. THE CIRCUMSTANCES WHICH FAVOUR INFECTION are numerous, and it is of importance that they should be recognised and well understood by the physician. These circumstances may be grouped — first, into those which are *intrinsic*, which concern the individual, or are proper to the recipient; — secondly, into those which are *extrinsic*, or which concur or co-operate with the infectious agent. — *a.* The circumstances proper to the recipient of infection are numerous, but the chief only of them can here receive particular notice. There is a *susceptibility* to infection from birth, which, in respect to some infections, diminishes with age, or is entirely exhausted or destroyed by the disease which it produces. This destruction of the susceptibility to infection is remarkable, as regards the exanthematic contagions, yellow fever, and hooping-cough; and, although it is not universal, yet the exceptions are very rare. In certain infectious maladies, as continued and typhoid fevers, the susceptibility increases with the progress to puberty, and diminishes gradually from the twenty-fifth or twenty-seventh year to old age. The danger, however, increases with this diminution, if infection actually takes place. Although typhoid fevers do not entirely exhaust the susceptibility to their infection, they manifestly weaken it. When a person has escaped infection, upon the first or the earlier exposures to several infectious maladies, he will generally continue to possess an immunity, unless circumstances should occur to increase his predisposition; for the infectious emanation produces a more sensible and marked effect on the economy, on the first occasion of exposure to it, than subsequently unless long intervals have elapsed between the periods of exposure. It is thus that several members of the same family so often escape, notwithstanding the rest are labouring under infectious maladies, — the susceptibility to them diminishing with the frequency of exposure, unless concurrent causes or influences reinforce the infecting agent.

52. The kind of susceptibility, which disposes to infection, varies much with different infectious maladies. In some, as typhoid fevers, youth and the prime of life are predisposing circumstances; and yet, fear of the disease, fatigue, exhaustion, and other causes altogether of an opposite character, have a similar influence, and concur with it. In others, as yellow fever, the seasoning, pernicious, and malignant fevers of warm climates, persons in the prime of life, and of the most robust

and plethoric constitutions, are the most liable to infection; whilst remittents and agues usually affect, in preference, the more debilitated, and persons of a weaker and more delicate frame. Most of the maladies, which are capable of propagating themselves, exhaust the susceptibility to reinfection. The chief exceptions to this are—venereal affections, plague, and purulent ophthalmia; whereas, the infections which are incapable of propagating themselves, unless other causes be superadded, particularly those which consist principally of emanations from decayed vegetable products, leave after them an increased disposition to reinfection. A person who has once had an attack of periodic fever, is more susceptible of infection upon exposure to malaria; and a smaller dose of the poison will take effect.

53. Of the other sources of susceptibility to infection, the most important are — fear and the depressing passions, disorder of the digestive organs, general ill health, and whatever impairs the powers of life. All infectious agents produce a morbid impression on the nervous system, and contaminate the circulating and secreted fluids, with a rapidity, and to an extent, *cæteris paribus*, according to the weakness of vital power and resistance. When the nervous influence and vascular tone and action are insufficient to oppose these agents, the infection then takes effect; the morbid influence extends; the circulating fluids are either early contaminated, or soon become deteriorated; and thus the whole frame is brought, not only under the influence of, but is actually polluted by, the disease.

54. There are other circumstances which predispose to, or increase, the susceptibility of infection; but they are so well known, in respect both of their nature and modes of operation, that they need not be noticed at this place. They are chiefly *extrinsic* to the body; and either precede, or are nearly coetaneous in their action with, the infectious agent. Those which *subsequently come in aid* of this agent, and aggravate, modify, and complicate its mode of operation and effects, have already been alluded to (§ 27.). They will be found more fully discussed in the articles Disease (§ 61.), and Endemic and Epidemic Influences.

55. VIII. The Means which protect from Infection, and counteract its Impression and Operation, are of the greatest importance, as respects both the science of the physician and the safety of the community. These measures may be divided into — 1st, Those which protect by excluding and destroying infectious agents, or by preventing communication with infectious persons or things; — and, 2dly, Those which are prophylactic, and which guard or fortify the individual against the impression or contamination of infections and contagions. — *The first of these classes of preservative means may be subdivided into* — 1. Quarantine, and the separation of the infected from the healthy; — 2. The exclusion of infected articles, or the destruction of all infection existing in them; — and, 3. The dilution and destruction of the infections floating in the air, or in any other medium.

56. *A. The separation of the infected from the healthy* is the chief means by which a distemper can be prevented from extending. This can be enforced only by governments, and local authorities, when a pestilential or infectious epidemic threatens a country or district. To the neglect or imperfect accomplishment of the measures which belong to quarantine, is chiefly to be imputed the extension of pestilential maladies, particularly in countries bordering on the Mediterranean. The difficulty, however, of putting these measures in force, and the facilities of evading them, especially by the transmission of infected clothes and other fomites, and as regards continental countries having an extended boundary, or populous cities or towns having an extensive communication, are so great, that numerous instances of their infraction must occur, and the chances of the introduction of these maladies be thereby increased. The extension of plague, yellow fever, and pestilential cholera, in different countries, has been entirely owing to the neglect of quarantine and of other means of prevention. If these means could be duly enforced in all their relations, not only those, but other infectious maladies, as typhoid fevers and small-pox, might be either entirely excluded from certain localities, or remarkably limited in their spread, particularly where the situation and boundaries of a place favour the application of these means.

57. Next to the exclusion of infected persons or things from a place, the removal of those first infected to suitable places, where they may be properly treated, and where the extension of the disease is duly guarded against, is of importance. The habitations of infected persons should undergo the processes of cleansing, fumigation, &c., about to be noticed; and all intercouse between the infected house, and those adjoining, ought to be prevented, or placed under certain restrictions. In large commercial towns, and in populous districts, where a strict quarantine or sanatory measures, calculated entirely to prevent a malady from extending, cannot be maintained, the mischief resulting from the attempt will be greater than the benefits which will arise to the community. But where they may be enforced, owing to the nature of the locality and other circumstances favourable to their due maintenance, they should be adopted, notwithstanding the temporary losses, or even distresses, of the place thus sequestered; for the advantages of the few should give place to the safety of the many.

58. As intimately connected with all regulations of quarantine and seclusion, *the duration of the period which elapses from the impression of the infectious agent, to the development of the disease*, should be taken into consideration. On this subject, the information which I have attempted to give (§ 29.) will be found useful. It is obvious that a person may be exposed to a source of infection in one place, and may travel a long distance during the period of formative or smouldering action, and not experience the developed malady until after his arrival in a healthy locality, where he may introduce the infection. In the present day of rapid conveyance, a person may carry an infectious malady, which he has caught in London, to any of the remotest parts of the kingdom, or from almost any European country to this.

59. It is of no less importance to know *the time which a person who has been ill of disease capable of transmission from one to another, retains the power of infection*; but this is a matter of still greater difficulty, even than the knowledge of the duration of the precursory period. The body

itself, probably, loses the power of transmitting a malady, as soon as convalescence is so far established as to admit of free exercise in the open air. Probably a fortnight after the commencement of recovery from most infectious maladies, the power of spreading them has ceased. Where a disease has been communicated at so late a period as this, there is every reason to suppose that the clothes have been concerned in its communication. It is, however, most difficult to assign a precise period with reference to any infectious malady, as its duration will entirely depend upon the personal habits of the individual, upon the ventilation and means of purification resorted to during illness as well as during convalescence, and upon the care taken with his clothes and person. Amongst the lower classes, infection probably continues longer to attach itself to the person than the period now named, owing to circumstances peculiar to them; and there is every reason to believe that it may continue in their apartments or dwellings even weeks and months afterwards, unless disinfecting means be carefully employed.

60. *B.* In many situations, and in several distempers, *the chances of infection by fomites* are much greater than by communication with the sick.— Articles of bedding, feathers, furs, body-clothes, &c., which have imbibed the effluvium of the affected, readily transmit most of the infectious diseases of this country, as well as the pestilential maladies of other countries, to very distant parts. It is astonishing, how long woollen and silken bed and body-clothes will retain the effluvium, so as to affect the healthy by it, when closely packed together, or excluded from ventilation. The animal miasm, which the clothes worn in dissecting rooms have imbibed, will be sensibly perceived many months afterwards, if they have been put in a close place, immediately after they were saturated with the foul air. The necessity of subjecting these articles to ablution, to free ventilation, and to other means of purification, is sufficiently obvious; but, by the lower classes, and even by other persons, all precautionary measures, even those which merely consist of common cleanliness, are most flagitiously neglected, although amongst them those measures are the most requisite. The crowded, low, close, and dirty state of their apartments, and the neglect of ventilation by them in all circumstances, and especially during disease, demand a stricter enforcement of purification, or disinfection, amongst them than elsewhere. Before articles from them or other infected sources are introduced amongst healthy predisposed persons, they should be subjected to the disinfecting agents about to be noticed; and to the perflation of the air in suitable situations, or in places from which the public are excluded.

61. *C. Disinfection.*—During the continuance of an infectious malady in a family or place, it is the duty of the inmates of the one, and of the authorities of the other, to put in force certain *measures of disinfection;* particularly when, owing to the general prevalence or nature of the malady, it may not be deemed requisite to remove the sick to places suitable for their seclusion and treatment. In all circumstances, however, disinfecting means should be employed, as tending, not only to protect the healthy, but also to aid the infected. For it is obvious, that it is much to the advantage of the latter to have the air and clothes, in which they are confined, frequently renewed, and the morbid effluvium removed or counteracted, than to be subject to its concentrated influence during the course of the malady. To dilute, therefore, or to destroy, the infections floating in the air, or attached to any other medium, is a duty we owe both to the sick and to the healthy.

62. *a.* Amongst disinfecting means, a *perflation of pure dry air*, and the abstraction of all sources of humidity, are the most universally beneficial and applicable. These alone prevent several maladies, particularly those which proceed from the sources of infection, ranged under the first and second classes of these agents (§ 4.), from propagating themselves; and when they can be fully enforced, they prevent the extension of most of those distempers, which always proceed from specific infection and contagion. Whatever may be the sources of the morbid effluvium or emanation, dilution by a free ventilation will either weaken or destroy it—at least, so far as to cause it to fail to produce its usual effects. This result will be more certainly obtained when the air is dry. High ranges of temperature, by increasing the humidity of the atmosphere, favour infection, if a very free ventilation is not preserved; and cold, although preventing infection when there is a free circulation of air, often also promotes it, owing to the means used to prevent currents of cold air. This is frequently evinced by the evolution or propagation of infectious diseases in the close wards of hospitals and other places, during winter and spring.

63. *b. Various means* have been resorted to for *the destruction* or *neutralisation of infectious emanations*, especially during the prevalence of destructive epidemics or pestilences. In the desire to establish the efficacy of recently introduced disinfectants, the older means have been undeservedly depreciated. Although the former are the most efficacious, yet it follows not that the latter were devoid of all disinfecting powers. The advantages derived in former times from *fumigations* by camphor, benzoin, myrrh, tar, and terebinthinate substances, and by numerous aromatic, fragrant, and stimulating drugs, were owing to more than one circumstance. These means not only inspired those who used them with confidence, but also in some measure neutralised the operation of the infectious emanation. The fumes from them, and from other exciting and fragrant substances, often counteracted the impression made by the morbid emanation upon the nervous system, by preventing the depression it would otherwise have produced. On this account they may still be resorted to with advantage in some circumstances, particularly in cases of casual or short exposure to infectious emanations, or when it is desired to counteract those which are the less virulent and not generally diffused. When judiciously employed, many of these substances aid the recovery of the sick, especially when the disease is attended by much depression of vital power. Until the discovery of Labarracque's disinfecting fluid, and of the uses of the chloride of lime, they were the chief means that could be employed in the chambers of the sick; those which are next to be noticed, being, from their acrimony, suited chiefly to uninhabited houses.

64. *c. Acids* have long been in use as disinfecting agents, under the impression that they possess the property of decomposing infectious

emanations, or at least of diminishing their virulence. With this idea, the once popular nostrum, well known under the name of "*Thieves' vinegar*," was brought into notice, and even at the present day, under the name of "*Aromatic vinegar*," it is much used by persons exposed to infection, and, I believe, often with advantage. Letters and papers brought from an infected locality are not infrequently dipped in *vinegar*; while clothes and other fomites, transmitted from a similar source of infection, are exposed to the fumes arising from the slow combustion of sulphur, or, in other words, to the action of *sulphurous acid*; but as this latter is found to be injurious to the respiratory organs, and as the powers of the former are too weak to be relied upon when acids are indicated for the purpose of disinfection, the *nitrous* and the *hydrochloric* are those principally used, although not without some risk to the inhabitants of the apartments subjected to their action.—*Nitrous acid* was first employed by Dr. JOHNSTONE and Dr. CARMICHAEL SMYTH. The latter, however, obtained the parliamentary grant for the disputed discovery; and, in 1780, employed this acid to arrest the progress of a fever which was then raging at Winchester, among the Spanish prisoners confined in that city; and subsequently, numerous ships and hospitals, which had become the seat of infection, were exposed to the same agent with success. It may be easily obtained by the combination of nitre and sulphuric acid in proper proportions; and it possesses the advantage of not requiring the aid of heat to effect the development of its fumes.

65. *Hydrochloric acid* was introduced in 1773, by GUYTON MORVEAU, for the purpose of purifying the principal church at Dijon, the emanations from the crowded vaults below having so infected the air of the building, as to render it unfit for public service. This acid was soon afterwards employed with a similar intention in the prison of the same city; and its success in this case also served to establish its reputation. But the application of heat is necessary to procure the evolution of the fumes with rapidity, from the substances from which it is usually prepared. As its use is not without some danger to animal life, it is desirable that no heat should be applied when it is employed to disinfect inhabited apartments, and that the process should be allowed to go on slowly. But, however great may have been the reputation of both the nitrous and hydrochloric acids in times past, they are rarely used in the present day—both being compelled to yield to chlorine.

66. *d*. *Chlorine* was first brought into notice as a disinfecting agent by M. FOURCROY, in 1791; and was subsequently employed as such, on various occasions, by Mr. CRUIKSHANK of Woolwich, and by M. GUYTON MORVEAU. It has since been used by Dr. FARADAY for the purification of the Milbank Penitentiary; an account of which was published by this celebrated chemist, in the 18th volume of the *Journal of Sciences and the Arts*. Chlorine, for the purpose of fumigating, is most readily and usually obtained, as is well known, by mixing chloride of sodium and the peroxide of manganese, and adding to them a due proportion of sulphuric acid; but as it is extremely irritating to the membrane lining the bronchi and the air-cells of the lungs, when evolved in any considerable quantity, and as it is hence totally inapplicable to inhabited apartments or wards of hospitals, the above process is entirely unavailable on these occasions. To obviate this inconvenience, M. GUYTON MORVEAU introduced a very ingenious apparatus, by which the issue of gas could be regulated at pleasure: but this and all other processes have been altogether superseded by the introduction, by M. LABARRAQUE, of the *chloride of lime* and *chlorinated soda*. There has been, indeed, much discussion as to the chemical nature of these compounds, but this is a subject not requiring notice here; practically it is of far greater importance to know that they are most powerful disinfectants, and that their success has been unequivocal in the most varied cases wherein the use of these agents are indicated. M. LABARRAQUE recommends the *chloride of lime* as the substance best adapted for infected apartments, and considers the *chlorinated soda* as more applicable to foul wounds, ulcers, &c. Both these substances, however, possess the property of preventing infection or putrefaction, and of arresting it when it has commenced; and they may both be used with perfect safety in sick chambers, in the wards of hospitals, and in prisons and other inhabited places. When it is desired to purify any of these apartments, portions of linen, steeped in the solution, should be hung in various places about the room, and the floor and walls frequently and freely sprinkled with it. Some persons, however, with more nicety than discretion, object to the use of these substances, in consequence of the unpleasant odour of chlorine, which they declare to be equally or more offensive than that of the infectious effluvium; but it should be borne in mind, that the existence of the latter is pregnant with danger to those exposed to it, whilst, in the diffusion of chlorine by means of these liquids, there is nothing pernicious to life.

67. Besides cleansing the air, chlorine, and all other purifying fumigations, will have a similar effect on the various solid substances and articles of furniture in the infected apartment. It is prudent, however, in addition to the employment of the above measures, to wash these substances well with soap and water; and as soon as the patient can be removed, the walls of the apartment should be whitewashed, and the room be well and freely ventilated, prior to its being again inhabited. All bed and body clothes removed from a patient labouring under an infectious disorder, should be at once immersed in hot water, or in a solution of an alkaline ley; and after being soaked in either for a considerable time, they should be subsequently hung out in the open air, and occasionally sprinkled with the chlorinated solution. It must not be forgotten, that the beneficial effect of chlorine will be exerted only on a limited quantity of air, and that it is by no means sufficient to correct any epidemic taint existing in the atmosphere of a district or place. When employed, however, in a limited atmosphere, this, and other disinfectants, have proved of no small advantage in checking the spread of infectious maladies; but the power which they possess, is far from being sufficient to preclude the necessity of avoiding unnecessary exposure to the sources of contagion, and of adopting preventive and precautionary measures.

68. *e*. In addition to the forementioned means, an *elevated temperature* has been recommended by

Dr. HENRY, as a powerful means of disinfecting fomites, or substances imbued with infectious emanations. The effect of heat has been principally tried in cases of *typhus* and *scarlatina;* and although its power to destroy the infectious properties of the effluvia produced by typhus may be questioned, yet the experiments of Dr. HENRY prove that the emanations of *scarlatina* are decomposed or dissipated by exposure, for an hour at least, to a temperature of 200°. And it must be acknowledged that, where heat is of itself sufficient to exert a beneficial influence upon infected clothing and other fomites, it is preferable for this purpose to chlorine, or any other fumigation, being more easily and more extensively diffused throughout the whole of the substances conveying infection. Its use is, however, limited to bed and body clothes, to trunks and packages, and other articles capable of imbibing and retaining the morbid emanation.

69. IX. PRECAUTIONS AGAINST INFECTION.— Every rational measure to avoid exposure to the infectious effluvia, whether emanating immediately from the bodies of the affected, or mediately from other sources, should be resorted to. Under this head, as strict seclusion as possible, and shunning intercourse with those most likely to have been amongst the infected, are deserving of attention. The predisposing and concurrent causes of DISEASE (see the article, §23. *et seq.* 61.) should be carefully avoided. Whatever tends, directly or indirectly, to debilitate or fatigue the body—whatever lowers its vital energy, as excesses of every description, low and unwholesome diet, and insufficient clothing, disposes to the operation of the exciting causes of infectious maladies. On the other hand, whatever tends to support this energy, and preserve in their due regularity the healthy functions of the frame, serves to render it impregnable to infectious agents. Exposure to cold, to chills, to the night-dew, to wet, and moisture; the use of cold fluids, and of cold, flatulent, and unripe fruits; should be carefully avoided. If, at any time, exposure to the night-air or to cold and moisture is inevitable, the system should be fortified against them; but the mode of doing this requires caution. It should not be attempted, unless when better means are not within reach, by wines or spirits, and, even then, these should be used in very moderate quantity; otherwise they will leave the system, as soon as their stimulating effects have passed off, more exposed than before to the invasion of infectious effluvia. Medicinal tonics and restoratives, however,— and those more especially which determine the circulation to the surface of the body, at the same time that they improve the tone of the digestive organs, and promote the regular functions of the bowels and biliary system,—may be resorted to on such occasions. For this purpose the infusions or decoctions of bark, of cascarilla, of calumba, &c., with the spirits of Mindererus, or any warm stomachic medicine, or the powdered bark, or the sulphate of quinine, or the balsams, may be taken either alone or with camphor, or with the aloes and myrrh pill, and any one of the spicy aromatics. These medicinal means are especially called for, whenever an infectious malady, of which the individual is susceptible, is present in a town or house in which the person resides; and they should be had recourse to when he retires to sleep, and in the morning before he leaves his room. He should, moreover, avoid sleeping in low and ill-ventilated apartments; and be equally distrustful of sleeping near, or even of passing through in the night-time, close and unwholesome situations and streets, particularly without having resorted to the medicinal means now suggested. (See art. ENDEMIC INFLUENCES.)

70. Care should be taken never to be exposed to the morning or night air with an empty stomach. A cup or two of coffee, and bread, previous to such exposures, will be serviceable. The stomach and bowels should be always attended to, and their functions regulated and carefully assisted; but in no case should these objects be attempted by cold, debilitating medicines, such as sulphate of magnesia, or other saline purgatives. The warm stomachic laxatives, or those combined with tonics, may be adopted with advantage, as occasion may require.

71. Particular attention ought to be paid to *personal* and *domestic cleanliness.* The surface of the body should be kept in its natural and perspirable state. The constant use of flannel nearest the skin will be serviceable for this purpose. Excessive perspirations ought to be avoided.

72. The *diet* should be regular, moderate, nutritious, and easy of digestion. Whilst every approach to low living should be shunned, its opposite ought never to be indulged in. The stomach should have no more to do than what it can perfectly accomplish without fatigue to itself, but to the promotion of its own energies. It must never be roused to a state of injurious excitement by palatable excitants, nor weakened by over distention, or too copious draughts of cold relaxing diluents.

73. The *state of the mind* also requires judicious regulation. It ought never to be excited much above, nor lowered beneath, its usual tenour. The imagination must not be allowed for a moment to dwell upon the painful considerations which the disease is calculated to bring before the mind, and least of all ought the *dread* of it to be encouraged. There is a moral courage sometimes possessed by individuals who are the weakest, perhaps, as respects physical powers, enabling them to resist more efficiently the causes of infectious and epidemic diseases, than the bodily powers of the strongest, who are not endowed with this form of mental energy. Those who dread not attacks of diseases, and who yet exercise sufficient prudence in avoiding unnecessary exposure to their predisposing and exciting causes, may justly be considered as subject to comparatively little risk from them. On all occasions, however, a foolhardy contempt or neglect of ailments, especially those affecting the stomach and bowels, ought to be guarded against.

74. During the occurrence of infectious diseases in a family, these precautions are still more imperatively required. A free *ventilation* of every apartment ought to be constantly observed, in conjunction with *fumigations* by means of aromatic substances kept slowly burning, or by the vapours of chlorinated soda or chloride of lime. If a quantity of a very weak solution of chloride of lime be put in a vessel, and some hydrochloric acid be poured upon it, and be placed in the hall, or the very lowest parts in a house, the disengaged gas will soon find its way in sufficient quantity to the higher apartments. The attendants on the

sick should particularly observe the measures now prescribed; and ought never to exert their attentions on the affected, so near their persons as to inhale their breath, or the effluvium emanating from them, without at least fortifying the vital energies in the way pointed out; and they should carefully avoid entering upon those duties with an empty stomach, or when fatigued.

75. Besides burning warm aromatic substances, and odoriferous gum-resins, in the apartments, and in those adjoining them, in which affected persons are or have been confined, solutions of chlorinated soda, or of the chloride of lime, or a saturated solution of camphor in aromatic vinegar, or in the pyroligneous acid, should be occasionally sprinkled on the floors, furniture, and bed-clothes. These means, with a thorough ventilation, and a due attention to cleanliness, will not only counteract the influence of the effluvium proceeding from the affected, and ward off its action even on the predisposed, but will also prevent the clothes, bedding, or furniture of the apartments of the sick, and the clothes of the attendants, from becoming imbued with it, so as to communicate the malady. They are within the reach nearly of all; and in the event of the extension of a pestilential infection or epidemic to any considerable town or city, if care were taken to see them put in practice, under the direction of medical councils of health, one of which should be formed in each district or quarter, much good would result from them. Keeping in recollection the principle which I have endeavoured to establish, — that the exciting cause of infection undoubtedly makes the first impression on the nerves of the lungs, — the advantages of those measures, from the circumstance of their being applied especially to this organ, must be obvious.

76. When a contagious substance has been accidentally applied to a wounded or to an abraded part, means to prevent its absorption, or contaminating influence, should be instantly resorted to, appropriately to the situation, and to the nature of the contagious principle. Ligatures above the seat of injury, and suction of the part, should be instantly employed; and ablution with a strong acid solution, — with muriatic and nitric acids, or with both, — the application of spirits of turpentine, of the nitrate of silver in substance, or in a strong solution, and similar measures, ought subsequently to be adopted. In cases of the inoculation of the virus of *rabies*, excision of the injured part should precede these means, when it can be performed. At the same time, the promotion of the digestive functions and of the constitutional powers, by the treatment already advised, will materially aid the local applications in preventing the development of disease.

77. X. TREATMENT WHEN SYMPTOMS OF INFECTION APPEAR. — When a person has been exposed to the sources of infection, and particularly when the symptoms I have described, indicate that infection has actually taken place, and that the disease is in the course of development, *are* there any means which will prevent its evolution, or render its course more mild, if prevention cannot be accomplished? I believe that a treatment may be adopted, which will often succeed in preventing, or in mitigating, the disease; and that these ends will frequently be attained in respect of several infectious maladies. There are some, however, which cannot be arrested after infection has taken place, or after the symptoms characterising the formative or precursory stage have appeared. Small-pox, and probably plague, scarlet fever, and measles, seem to be the chief maladies which may not be prevented from developing themselves after infection has made the full morbid impression on the economy.

78. In order to arrest the progress of infection, it is necessary to keep in recollection the conclusions as to the operation of infectious agents on the system, that may reasonably be drawn from observations, both pathological and experimental. These conclusions, as furnishing a basis for remedial indications, may be limited to the following: — 1st. That the *more immediate impression* of infections is made upon the nervous system of organic life. — 2d. That this impression is of a sedative or *depressive* kind. — 3d. That infectious agents not only *depress*, but also *modify* or *alter* the vital influence in a special manner, or, in other words, each infectious agent produces a peculiar or specific depressing effect. — 4th. That the vascular system and circulating fluids soon experience the effects of this impression; and that the action of certain infections and contagions are earlier displayed on this system, in respect of some contagions, than as regards others. — 5th. That the circulating, secreted, and excreted fluids undergo a consecutive and progressive change. — 6th. That the impression on the organic nervous and vascular systems, and the consecutive changes in the fluids, ultimately affect and impair the vital constitution and cohesion of the soft solids. — 7th. That, as an infectious agent exerts a depressing or sedative, as well as a special or peculiar, morbid impression, it is reasonable to infer, that whatever tends to increase the nervous power, will enable the energies of life to resist the morbid impression, to prevent the progress of contamination, and often ultimately to remove both their immediate and remote effects.

79. Conformably with these views, I have, on numerous occasions of exposure to infectious agents, advised a *restorative* and *tonic treatment*, with strict attention to the *prophylactic means* just advised. These should be continued for a period at least equal, and in most cases beyond, that which is required for the development of the disease. In many instances, this treatment should be preceded by an *emetic*, which may be conjoined with some warm or stimulating substance. A warm *stomachic purgative* should afterwards be exhibited; and hot diluents, with camphorated or aromatic substances, may also be given. The energies of life ought to be promoted by means suited to the habits and circumstances of the individual, particularly by tonics or light nutritious diet, and pure dry air. When the infectious agent produces, at the period of exposure to it, a sensibly depressing and morbid operation, it will be often of service to excite, as soon as possible, an artificial febrile commotion in the system, and to promote the secretions and excretions. The excitement will overcome the depressing effects, and the promotion of the secretions and excretions will preserve the blood in an uncontaminated state. Much, however, will depend upon the employment of the means appropriately to the condition and circumstances of the infected person.

80. When the primary operation of infectious

agents is characterised by great vital depression, it is surprising how large doses of tonic and restorative substances may be taken before this state is removed. A lady of a delicate constitution, usually unable to take more than two glasses of wine after dinner, without occasioning heat and discomfort, was exposed to concentrated effluvia of the exanthematic typhus now prevalent. She felt an unpleasant odour, followed by a sudden loss of strength, nausea, and all the symptoms, indicative of infection in a severe form. Her spirits were depressed; she stated her conviction that she had caught the infection, although she had approached it without any dread; gave directions as to her affairs, and resigned herself to her bed. I found her, with a weak, irregular pulse, slow and very compressible. The countenance was very pallid, and the mental and corporeal depression was extreme. — I prescribed camphor in the form of pill, and the decoction of cinchona with the compound tincture, the tincture of capsicum, the chlorate of potash, and carbonate of soda, in full and frequent doses. In the intervals, wine was given freely in the form of negus, a bottle being taken in the twenty-four hours in this form. These means were persisted in for two days, before the powers of life rallied; when a free and general perspiration broke out, and restoration quickly took place.

81. Of four persons who were exposed to the concentrated emanations of typhus, three of them were seen by me soon afterwards, owing to the appearance of symptoms of infection. They were all treated upon the same principles; sulphate of quinine and camphor in full doses, and as much purified extract of aloes as was necessary to keep the bowels open, were given every three or four hours, in two of these cases. The three, thus treated, soon ceased to experience the precursory symptoms. The fourth of these exposed persons was an aged female, and hence much less susceptible of typhus infection than the three young persons who had evidently caught the infection. She escaped, but carried the infection to her son and daughter. I might adduce numerous other proofs of the success of treatment during the period which elapses from exposure to infection, till the full evolution of its effects, if my limits could admit them. But I have advanced enough to show that appropriate means will often succeed in preventing the most severe and dangerous consequences, both to the person who has been exposed to infection, and to him who is experiencing its incipient or earlier effects. (*The above article is the substance of the Gulstonian Lectures, delivered by the Author at the Royal College of Physicians, in May,* 1838.)

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INFLAMMATION. — SYN. Φλόγωσις (from φλοξ, a flame), Φλεγμονὴ (from φλέγω, I burn), Φλέγμα, Φλέγμασια, Gr. *Inflammatio*, *Phlogosis*, *Phlegmone*, *Phlegmasia*, Lat. *Entzündung*, Germ. *Inflammation*, *Phlegmasie*, Fr. *Inflammazione*, Ital.

CLASSIF. — 1. *Class*, Febrile Diseases; 2. *Order*, Inflammations (*Cullen*). 3. *Class*, Diseases of the Sanguineous Function; 2. *Order*, Inflammations (*Good*). III. CLASS, I. ORDER (*Author*, in *Preface*).

1. DEFIN. *Alteration of the vital actions of a part, manifested by morbid sensibility or pain, by redness, increased temperature, and swelling, generally with more or less febrile commotion of the system.*

2. *Inflammations* or *phlegmasiæ* constitute one one of the most numerous classes of disease, and appear the most frequently in practice. They are the most common sources of structural lesions, whilst they are, in their developed states, them-

selves lesions of organisation, yet originating in changes which are not at first, although they rapidly become more and more, manifest. They are thus intermediate states between disordered vital action, and change of structure; retaining, however, the characteristics of the former condition, even when they have superinduced the latter. They may be seated in any organ of the body, and in any tissue, excepting the cuticle, hair, and nails; but certain structures or parts are much more frequently affected by them than others. The phenomena characterising inflammations; the changes in the circulating and secreted fluids attending them; the effects produced by them locally and constitutionally; the remarkable variations these effects present, with the state of the system, and with the exciting causes; and the almost universal liability of the tissues and organs to their invasion; combine to impart the utmost interest and importance to the investigation of their *nature* and *treatment*.

3. In treating of this subject, I shall describe — *First, the phenomena, local and general, constituting inflammation of a sthenic form*, or as observed in a previously healthy person, with *their course, and terminations*, or consequences; — *Secondly, the varieties or states inflammation assumes*, owing to certain predisposing, exciting, and concurrent causes, to the previous condition of the patient; to morbid associations; and to the tissues affected; — *Thirdly, the causes, and pathology, or rational theory, of inflammation*; — and, *Fourthly, the treatment*, with reference to the different forms, states, and complications of the disease. Under one or other of these heads, I hope appropriately to introduce every thing of importance connected with the *causes, nature*, and *treatment* of this most important, most common, and but imperfectly understood, deviation from the healthy state.

4. I. OF THE PHENOMENA CONSTITUTING STHENIC INFLAMMATION, AND OF THEIR COURSE AND TERMINATIONS.—It is necessary, in order to form a satisfactory view of inflammation, to consider first, its phenomena, as manifested in a previously healthy constitution. It then presents characters which have been variously denominated, in order to distinguish them from those which attend inflammation occurring in previously disordered frames, as the *adhesive, phlegmonous, healthy, reparative, sthenic*, &c. — I have preferred the last of these terms, as it is more appropriate to most of the states in which this species of the disease presents itself. As *sthenic inflammation* occurs both in acute or active, and in slighter or more chronic forms, I shall describe it accordingly, but with due reference, to the succession of one to the other, — to the usual procession of the morbid phenomena of each, — to the effects upon the circulation and secretions, and to the ultimate results.

5. i. OF ACUTE STHENIC INFLAMMATION. — *A. Local Characters.* — In this, which may be denominated the truest or the most unequivocal form of inflammation, there is an *increase of the vital actions*; but this increase must be of a certain duration, and the vital actions must be altered in character as well as in degree — must be truly *morbid* — as I have contended in the article DISEASE (§ 87. *et seq.*), to constitute inflammation, and to distinguish it from the vital turgescence which is temporarily produced by local stimuli, or even by mental excitement. The true seat of inflammation is always the ganglionic nervous system and the capillary vessels of the part affected; the primary change, as will hereafter be more fully shown, originating with the former, but more fully expressed in the latter, constituent of the organisation.*

6. *Acute sthenic inflammation* commences with increased or *altered sensibility or pain* of the part, to which soon succeeds *redness*, from increased vascularity — from the enlargement of vessels. The *temperature* of the part is raised, the *functions* disturbed, the *secretions* at first interrupted, and subsequently changed; and swelling takes place. These phenomena are always present in a more or less remarkable manner, or in different proportions, and are much augmented when the system sympathises, and febrile action is developed. Neither of these constitutes inflammation when existing singly; and but four of them have generally been considered requisite to its existence, namely, *pain, redness, heat*, and *swelling*. *Disturbance*, however, *of the functions* and *disorder of the secretions* of the part, are constantly present, and are as much constituents of the disease as are those more generally conceded to it. To these, *the local symptoms*, it will be necessary more particularly to advert, before the *constitutional disorder*, consequent upon the local affection, is considered.

7. *a. Uneasy sensation, from its lowest grade, until it amounts to acute pain*, is the primary symptom following the operation of the exciting cause, or characterises that kind of excitement, or deranged influence of the ganglionic nerves forming the first series of the changes in the affected part, and it is heightened or kept up by the alteration thereby induced in the action of the capillaries. When the uneasy sensation amounts to pain, it is owing either to the degree of change in the organic nervous fibrillæ, or to the communication of the morbid excitement, originating in these nerves, to the terminations of the cerebro-spinal nerves, with which they are associated in the tissues. The pain, therefore, of inflammation originates in, or arises from, a change in the state of the particular influence exerted by the organic nervous fibrillæ of the part; this change deranging the action of the capillaries supplied by these fibrillæ, and often exciting or otherwise disturbing the sensibility of the associated cerebro-spinal nerves. That the extension, however, of the morbid change to the latter nerves is merely contingent, is shown by the slightness of the pain, or by the absence of acute pain in many cases of severe inflammation of internal viscera, particularly those which are not supplied by these nerves; and that the morbid sensation originates in the organic or ganglial nerves, and not in the cerebro-spinal, is rendered probable by the circumstance of the most acute pains which are clearly referable to the latter class of nerves, as those of neuralgia, trismus, and other spasmodic affections, not being attended by inflammation.

8. The *uneasy sensation* is the sensible mani-

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* I may here state, that this and other views connected with the pathology of inflammation were published by me, first in 1815, and subsequently in 1820, 1822, and 1824, in the works referred to in the Bibliography. It is the more necessary to state this, as several of these views have been adopted by later writers, and brought forward with an air of originality to which they have no claims.

festation of the primary change in the organic nerves of the part, — of that change, which induces the vital expansion, or turgescence of the capillary vessels, and the consequent increased influx of blood. The morbid sensation is afterwards increased to *actual pain* by the circumstances just stated (§ 7.), and by the excessive expansion and tension taking place in that part. It differs in severity and character according to the degree of inflammation, and to the sensibility and structure of the affected part. It often consists of soreness or aching, — of pricking, itching, tickling, tension, heat, or burning, — of painful throbbing, tearing, darting, gnawing, &c.; and in parts abundantly supplied with nerves, particularly with the nerves of sensation, it is most acute. In mucous, cellular, and parenchymatous structures, the pain is rarely very severe. The substance of the brain, or of the lungs, or of the liver, or of the kidneys, is often acutely inflamed without sensibility being materially excited. Severe pain in these diseases is owing either to the extension of inflammation to the serous or fibrous structures, or to the tension of these tissues caused by the swelling of the parts they inclose. Unyielding and dense textures, as the fibrous, serous, and fibro-cartilaginous, are generally the most painful when acutely inflamed. — Pain does not always represent the true seat of the disease. In cases of partial inflammation of the substance of the brain, pain may be felt only in some remote part of a limb, or in a part of the scalp. During inflammation of the substance either of the lungs, or of the liver, or of the kidneys, or of the uterus, pain may be felt only in those ramifications of the cerebro-spinal nerves, which are most intimately related to the organic nerves of the affected part, as in the vicinity of the clavicle or shoulders, in the limbs, &c.

9. It is necessary to study, not only the severity and character of pain, with reference to the existence of inflammation, but also its types or modes. The uneasy sensation attending inflammation is generally constant; and, although often exasperated at times, it is never altogether absent. Even when no pain is complained of, as often occurs in inflammations of internal viscera, tenderness to the touch, or to pressure, is generally present. When, with continued pain, or with a sense of soreness, aching, or of throbbing synchronous with the pulse, or of heat, more or less constant, there are tenderness on pressure, and increase of the morbid sensation on exercising the functions of the part, inflammation may be inferred, even when other indications of it are absent. But the most severe pains, without tenderness, or with perfect tolerance of pressure, and especially if they are paroxysmal, and attended by complete intermissions, furnish no evidence of inflammation.

10. *b. Redness*, of itself, is not sufficient to indicate inflammation. It may arise from active congestion of the capillaries, or from a vital turgescence of only temporary duration. On the application of an irritant, redness of the part is not manifested immediately, although uneasy sensation is induced; but it soon is developed owing to the morbid excitement of the nervous fibrillæ, and like this morbid state, it is more or less permanent. The redness which has thus arisen is caused by the vital expansion of the capillaries, and by the admission of a larger current of blood into them, and of the colouring globules into a series of vessels which did not formerly admit them. The blood also, during the sthenic state of inflammation, becomes somewhat more florid than usual, in the capillary vessels. The redness is generally greatest in the centre of the inflamed part, or in that spot in which the irritation originated; but it spreads more or less, and is gradually lost in the surrounding tissues. The colour varies in depth or hue with the progress and form of inflammation; but, in the species now being considered, it is more or less florid or deep. In very vascular, or highly organised parts, the tint is deepest, owing to the more intense state of action.

11. Increased redness of a part may exist, as just stated, without inflammation. In order to impart to it essentially inflammatory characters, the vascular action from which the redness proceeds must not only be excited, but also otherwise changed from the healthy state. It must be rendered truly morbid. Stimuli or mental emotions will produce redness, but this redness is not inflammatory; it soon disappears, and gives rise to no consequences or lesions. The excitant or irritant must, from either its continued or its peculiar action, change or vitiate, as well as excite, the organic nerves of the part,—must impart to them a *truly morbid state* or influence, which similarly effects the vital actions of the capillaries, not merely exciting, but also modifying, that action, so as to give rise to effects very different from those observed in health. In this respect, chiefly, the redness of inflammation differs from simple vascular excitement, or injection or congestion. In this latter state, the vessels are distended, and contain more than their usual quantity of blood, the circulation through them varying in activity, — either rising above, or sinking below, the common grade of celerity. This state, to which only the very loose and often inappropriately employed term, *hyperæmia*, recently introduced into pathological discussions, is applicable, is, however, very different from true inflammation, although it may be readily converted into some one of the varieties of inflammation. It is unattended by that morbid state of the organic nerves of the part, upon which the true inflammatory action of the capillaries depends. However denominated, whether *congestion* or *hyperæmia* — or however qualified by the prefix *active* or *passive*, it forms no essential part, and constitutes no particular stage, of sthenic inflammation, as supposed by some recent writers.

12. If we trace *the course* of the vascular disturbance, we shall find that a contraction of the capillaries of the part follows upon the application of an irritant, and upon the change produced in the organic nerves of the part. The contraction is soon followed by a reaction or vital expansion of these vessels, an increased afflux of blood, and the other phenomena of the excited vital process. The veins receive the blood from the minutest ramifications of the capillaries, in such a manner as naturally to retard the capillary circulation in them. Consequently, when the action of the capillaries is morbidly increased, expansion of these vessels, and an excessive accumulation of blood in them, must necessarily follow; for the veins are incapable of receiving, and carrying onwards with sufficient rapidity, the quantity of blood sent to them. Owing to this circumstance, vessels pre-

viously admitting only the colourless blood, become expanded, so as to admit the red globules; and as the morbid process goes on, new vessels are probably developed; the blood also becoming, and continuing to be, more florid, as long as the sthenic action persists.

13. *c. Increased heat*, as well as augmented redness, is the result of the morbidly excited action. Experiments, however, with the thermometer, show that the warmth of inflamed parts is not so great as the sensations usually indicate.— Some writers, as HUNTER, ABERNETHY, MAYO, and others, contend, there is actually no increase of the temperature above the healthy standard; but such is not the case. The temperature of an inflamed part upon, or near the surface, is usually several degrees higher than that of parts at some distance from it; and even the deep-seated viscera experience a rise of two or three degrees, and often much more, above the healthy temperature of 98°. The existence of heat, even with increased redness, is not an unequivocal symptom of inflammation; for it may depend upon temporary or healthy excitement merely. It is necessary to be continued to indicate a morbid state of action. Moreover, it may be so slightly augmented as to escape notice.

14. As to *the source* of heat in inflamed parts, some difference of opinion has existed.— Since CRAWFORD proposed the theory of the dependence of animal heat upon the different capacities of venous and arterial blood for caloric, the warmth of these parts has been imputed by many to the quantity of blood circulating through them, and passing from the arterial to the venous state. Without occupying my limits with the opinions and discussions as to animal heat, I may remark, that Sir B. BRODIE considered, from his experiments, that the cerebro-spinal nervous system was instrumental in its production. This opinion, however, was not confirmed by the researches of LEGALLOIS, W. PHILIP, and HASTINGS. In 1820, 1822, and 1824, I published my views on the subject (see *Lond. Med. Repos.* vol. xvii. p. 370., and *Appendix* to RICHERAND's *Elements of Physiology*, p. 630.), and contended that animal heat is not the result of the difference of capacity existing between venous and arterial blood; for, as Dr. DAVY has shown, this difference is not sufficient to explain the phenomenon, although it may be subordinately concerned in producing it. I then stated, that the various causes, which modify the production of animal heat act — 1st, immediately upon the organic system of nerves; — 2dly, upon the blood; — and, 3dly, through the medium of the cerebro-spinal system, modifying the influence which this system imparts to the ganglial. I then viewed animal heat more as a vital secretion than as a chemical phenomenon, — as proceeding from, and as being controlled by, the influence exerted by the ganglial system of nerves upon the vascular system and blood; and the subsequent researches of CHOSSAT and EDWARDS obviously confirm this opinion. Conformably with this view, I have stated, in the works referred to, that the increased heat of inflammation is derived from the same source, —from the influence of the organic nerves upon the vessels of the affected part, aided by the increased circulation through the capillaries; the nervous influence enlarging these vessels, or occasioning an erectile state of them, and thereby soliciting an afflux of blood to the part. The increased temperature of erectile tissues, consequent upon irritation of their nerves and expansion of their vessels, fully illustrates this theory of animal heat, and particularly with reference to inflammation.

15. *d. Swelling* has been assigned above as one of the changes constituting inflammation. But, from what I have already stated, it should be viewed rather as a consequence of this act, than as an essential part of it. Besides, swelling is not always present, owing to circumstances about to be noticed. The morbid state of the organic nerves and the expansion of the capillaries are the earliest causes of swelling. But, as the diseased action proceeds, a more or less copious exudation of serum into the areolar tissue takes place; a portion of the serum and even of the red particles of the blood passes through the pores or distended walls of the capillary canals, especially in cellular or mucous tissues, distending, tumifying, and thickening the inflamed part. Hence the areolæ of cellular structures are found filled with a serous, sero-albuminous, and often with a sanguineous fluid, in which flocculi are sometimes seen floating, or adhering to the parietes of the areolæ or cells; these parietes being often thickened.

16. The *nature* of the swelling entirely depends upon the state or kind of fluid thus exuded from the inflamed capillaries.—The *state* of the fluid depends upon the kind of disorder of the organic nervous influence of the part, and of the constitution generally, and upon the degree of vital power exerted by the system.— In the *sthenic species* of inflammation, this power, however much it may deviate from the healthy condition, is at least not depressed below this condition. The fluid exuded is therefore a product of increased or sthenic vascular action, excited and kept up by the influence exerted on the capillaries by the nerves in which the disorder originated. Hence it is generally sero-albuminous, or a mixture of serum and coagulating lymph, sometimes containing colouring particles when the morbid action is intense; and the consequent swelling is firm, tense, and limited as to extent. The sero-albuminous or coagulating character of the effused fluid entirely depends upon the sthenic nature of the inflammation, and is of the utmost importance as respects the subsequent changes. When the organic nervous or vital power, locally or generally, is depressed, or otherwise vitiated as well as depressed, the effused fluid is not albuminous, and does not coagulate. It is then either serous, or sanguineous, or even sanious; and does not possess the characters of coagulable lymph. The consequent swelling is œdematous, soft, diffusive, or spreading, owing to the fluid state of the exudation, and its more ready infiltration into the surrounding parts. Whilst organic nervous or vital power is unreduced, the exuded matter occasioning the swelling in the advanced stage of inflammation, at least partially coagulates, and limits the extension of tumefaction. But when this power is much reduced, or greatly vitiated, as in the different forms of *asthenic* inflammation, this matter retains its fluidity, infiltrating and infecting the surrounding tissues.

17. The existence and amount of swelling chiefly depends upon the nature of the inflamed tissue. It is neither so early nor so obviously present in inflammation of dense structures, as in

that of soft and yielding parts. It is inconsiderable in fibrous, fibro-cartilaginous, and serous tissues, and is hardly apparent until the morbid action has continued for some time. In cellular, mucous, and parenchymatous tissues, the swelling is early and considerable. In certain parts, as in cellular tissue bound down by aponeurotic expansions, and in the internal structure of organs surrounded by fibrous or unyielding membranes, the swelling is less, or more slowly developed; the pressure thus occasioned restraining the effusion and the expansion of the capillaries. But, where the morbid action is intense, the pressure gives rise to a most distressing sense of tension, interrupts the functions of the organ, and sometimes even the circulation in it, thereby destroying its vitality and occasioning dissolution. When the substance of the brain is inflamed, the nature of its circulation, the great division and tenuity of its capillaries, and the unyielding nature of its surrounding structures, combine to prevent it from becoming much swollen. Yet there is every reason to believe that more or less swelling actually occurs (see art. APOPLEXY, and BRAIN —*Inflammation of*), and that the pressure on the inflamed organ, occasioned by the unyielding parts surrounding it, gives rise to the more dangerous symptoms observed in the advanced progress of the disease.

18. *e.* The *functions* of an inflamed organ, tissue, or part, are, as Mr. MORGAN has very justly contended, more or less disordered; and I may add, that the disorder is one of the earliest phenomena or constituents of the morbid action, being nearly coëtaneous with the change in the organic nervous power, on which this action depends. The disturbance of the functions is generally in proportion to the violence of the disease. If the inflamed part performs a secreting function, the secretion is either diminished, increased, or altered in character. — *Diminution* of this function is observed, when the cutaneous surface is inflamed, at the commencement of acute inflammation of serous and mucous membranes, and when the morbid action in glandular secreting organs is sudden or intense. When parts near the surface are inflamed, perspiration is obstructed, and the temperature is thereby increased. It is only at the commencement of inflammatory action in serous and mucous surfaces, that their secretions are diminished: as the disease proceeds, their secretions become increased, but at the same time changed in their characters; the change varying with the intensity, form, and duration of morbid action, and with the state of the patient. Inflammation of glandular organs is generally attended by suspension or diminution of their secretions, as in hepatitis, nephritis, &c. But in many cases, one kidney only, or a portion of the liver, may be inflamed, the secretion being only diminished or somewhat altered. It should, however, be recollected, that the secretions of an organ may be suspended, increased, or morbidly affected, otherwise than by inflammatory action.

19. The lesion of function attending the commencement of inflammation obviously depends upon the primary affection of the organic nerves. That accompanying the advanced progress of the morbid action proceeds not only from this source, but also from the alteration in the capillary circulation, from the consequent effusion of lymph in the inflamed tissue, and from the swelling and mechanical obstruction thereby produced.

20. The *throbbing* is connected with the obstruction to the return of blood, particularly from the expanded capillaries, into the veins. It is synchronous with the pulse, and is caused by the injection of blood into the part on each contraction of the left ventricle of the heart. It increases and renders the pain pulsatile; when it occurs at an advanced stage of inflammation, it is usually soon followed by suppuration. It is increased by a depending position of the inflamed part, and by whatever either obstructs the return of blood from, or favours the flow of it to, the seat of disease.

21. *B.* OF THE LOCAL APPEARANCES AFTER DEATH. — Certain of the preceding local characters of inflammation necessarily disappear with the termination of life; and the rest, as redness and swelling, either vanish, or remain for some time afterwards.—*Redness* does not always continue after death; its absence, therefore, is no proof that inflammation had not existed during life. Its presence also, *post mortem*, is not sufficient evidence of its dependence upon this cause. At an early stage of inflammation, and before the capillaries have lost their vital tone or contractility, and before much serum or lymph has been effused, redness generally disappears after death. Even when much effusion of fluid, and other changes consequent upon the morbid vascular action, have taken place, the blood may have entirely forsaken the vessels before the parts have been examined. Where redness actually exists, much discrimination is necessary to determine, whether or not it has proceeded from inflammation, or from a dependent position, or from transudation of the colouring matter of the blood from the vessels, or from incipient decomposition. It may arise from either of these. In many cases, two or more combine to produce it: a depending position favours both the gravitation of the fluids in the vessels, and the exudation of the colouring particles in the lower parts. The injection caused by position more readily occurs in parts which have been inflamed, than in those previously sound. Much, however, depends upon the seat and form of inflammation, and upon the circumstances connected with dissolution. Next to position, obstructed circulation through the heart or lungs, or obstruction to the return of blood in the veins, most frequently occasions non-inflammatory injection and redness, particularly in mucous surfaces; but, in such instances, the redness is more or less general or diffused in these parts, or exists in situations remote from each other, and is not attended by the usual products of inflammation. Attention to the circumstances causing redness of parts after death will generally enable the practitioner to infer with accuracy its dependence upon inflammation. When it is associated with any of the usual products or consequences of this disease, as the effusion of lymph, or of a sero-albuminous fluid, with softening, swelling, &c., then no doubt as to its origin need be entertained. (See *Diagnosis.*)

22. *C.* OF THE CONSTITUTIONAL SYMPTOMS OR EFFECTS OF STHENIC INFLAMMATION. — The constitutional phenomena vary remarkably with the exciting causes, the intensity, and the seat of inflammation; and they are further modified by age, habit of body, diathesis, and epidemic constitution.—When inflammatory action takes place in

a previously healthy person, and from causes which do not materially vitiate or depress the vital powers, or contaminate the circulating fluids, the constitutional effect presents certain features which are rarely wanting. It has been variously denominated, as *Symptomatic Inflammatory Fever*; —*Sympathetic Synocha*;—*General vascular Reaction*; — *Inflammatory Fever*, &c.; and has been improperly described in connection with, or rather as a species of, true fever. Indeed, some writers, as I have shown in the article FEVER (§ 91.), particularly CLUTTERBUCK, MARCUS, and BROUSSAIS, have contended that the *constitutional affection*, produced by the local changes constituting inflammation, is in no respects different from *idiopathic fever*. In the article just referred to, I have stated sufficient to prove the very remarkable differences between the two (§ 26—30.); and I shall hereafter succinctly notice the subject. Indeed, the former is altogether distinct from the latter, and should not be considered in connection with it, further than to point out the diagnosis.

23. In some constitutions, particularly the sanguineous, the irritable, and the nervous, the local lesions described above (§ 6.), very soon after their commencement, create more or less constitutional disturbance and febrile commotion; whilst in others, as the phlegmatic or lymphatic, the melancholic or bilious, these lesions may have been of some continuance, or have proceeded far, before general disorder is developed, or becomes severe. The local change being the same, the constitutional effect will vary remarkably in grade, form, and course, according to these and other circumstances just mentioned. In some, it will be rapidly developed; in others, slowly, or after a precursory period of longer or shorter duration, or after several efforts to produce it. The earlier constitutional symptoms are often neglected by the patient, and are seldom subjected to the physician. Occasionally the patient experiences chills or rigors more or less severe, almost immediately after sensations of pain or uneasiness. In rarer cases, morbid sensation is not produced, until either during, or after, the rigors. This is observed most frequently in inflammations of internal organs. More commonly the patient complains, in connection with pain, of uneasiness, or other morbid states of sensation referrible to a particular part, of weakness of the limbs, lassitude, general uneasiness, or lowness of spirits, of slight chills, formication, or of an alternation of slight chills and flushings. These may be the only precursors; or they may be attended by disturbed sleep, a whitish or loaded tongue, a clammy state of the mouth, with vitiated taste, want of appetite, constipation, &c. With these, the local symptoms are aggravated, and severe rigors or shudderings are more or less rapidly produced. The rigors are sometimes accompanied with nausea or vomiting. The countenance, general surface, and extremities, which were pale, harsh, or cold, during the rigors and chills, soon afterwards become warm; and the pulse, which was previously small or constricted, and but little accelerated, increases in quickness and volume. The consequent phenomena appear with a rapidity and severity, varying with the intensity and extent of the local action. The secretions and excretions are diminished, and subsequently vitiated. The skin is hot and burning, the face flushed; the tongue is white, furred, or loaded, and, with the mouth, somewhat dry or clammy; the appetite is gone; thirst is urgent; the bowels are constipated; the urine is scanty, high-coloured, clear, and emits a strong odour; and pains are often felt in the back, or loins, limbs, or head, in addition to those referred to the inflamed organ. The symptoms indicate general vascular excitement and its usual consequences, unconnected with depression of vital power, or contamination of the fluids. When they are severe or intense, and when the energies of life become exhausted, delirium sometimes takes place, particularly at night; but it rarely appears early, unless the brain is the seat of inflammation, or readily sympathises with the local affection, as in inflammation of the diaphragm or of fibrinous parts.

24. The acuteness of the general symptoms is not always in relation to the severity of the local changes; but, according to the intensity of either, or of both, will the type of the former be more manifestly continued. The less severe states of constitutional affection, and particularly when the local morbid action is neither extensive nor very acute, are characterised by exacerbations in the evening or night, during which the local symptoms are more or less exasperated; restlessness and want of sleep being generally present. In the morning the symptoms are ameliorated, and a tendency to perspiration appears. The course and duration of the constitutional affection vary with the severity and the seat of the local disease, and with the circumstances proper to the individual affected. The symptoms usually increase either gradually or rapidly, according to the nature of the exciting causes, the acuteness of the attack, and the circumstances just alluded to, until they arrive at a certain pitch or *acmé*, from which they decline more or less rapidly in some cases, and slowly in others. This change, whether taking place gradually and slowly, or suddenly and rapidly, depends entirely upon the state of the local affection. If the local symptoms gradually decline, the general disturbance subsides in a similar manner; and if any of the more unfavourable terminations of the local disease about to be noticed occurs, the system evinces the change, as will be hereafter stated.

25. *D.* OF THE CHANGES OBSERVED IN THE BLOOD IN STHENIC INFLAMMATION. — These vary remarkably with the circumstances determining the severity, seat, and course of the disease. I have described them so fully in the article BLOOD (§ 96. *et seq.*), that little more need be here adduced upon the subject.—Much importance has been attached to the existence of a *buffy coat*, and of a *cupped* appearance of the coagulum. These states of the blood are most frequently observed in the species of inflammation now being considered. But they are not always, nor even very generally, present, nor at all stages of the disease in which they occur. They are even more commonly met with in some complaints which, although nearly allied to inflammation, are not purely inflammatory, as rheumatism. They have frequently a marked reference to the stage and seat of inflammation. In acute rheumatism they are very remarkable, and often become more so as depletions are repeated. I once witnessed a case of the internal metastasis of rheumatism, for which venæsection was repeated several times. The buffed and cupped appearances became more and more remarkable; and yet, upon examination after death,

no signs of inflammation could be detected, and the internal viscera were quite bloodless. When, however, serous and fibrous structures are inflamed, these states of the coagulum very generally exist. During acute inflammation of cellular and mucous tissues, they are much less frequently observed. When compound or parenchymatous structures are inflamed, they are met with chiefly in certain stages and states of the disease. When an important or vital organ is inflamed, and especially when the patient is plethoric, and the circulation oppressed, these appearances often do not take place until the vascular load and oppression are removed, and the circulation is rendered free. There are various other circumstances which affect the state of the coagulum in acute sthenic inflammations, but they are noticed in the article just referred to. It is chiefly in the venous blood that *cupped* and *buffed* appearances have been seen; for the occasions of noticing them in arterial blood are comparatively rare and unfavourable to their occurrence. They have, however, been met with in arterial blood by Gordon, Gendrin, and others.

26. *The coagulation of the blood*, and the origin of the buffy coat of the coagulum, have been so fully considered elsewhere (see art. Blood, and my *Appendix* to Richerand's *Elements of Physiology*, p. 638.), that I need adduce but little further on the subject, than to state the facts ascertained, and the inferences deduced, from my investigations, and published in 1824, in the first edition of the *Appendix* just mentioned. — The blood during life consists of serum, holding in suspension small regular and insoluble globules, each of which is composed of a central colourless spheroid corpuscle, and a coloured envelope. The latter always continues to surround the former during life; but, as life departs, and as the motion to which it gives rise ceases, the attraction between the central corpuscles and their coloured envelopes no longer exists, the one completely separating from the other. The central corpuscles then obey the force which tends to unite them, and form a network in whose meshes the liberated colouring matter, now detached from these corpuscles, becomes inclosed, and thus the coagulum is formed. These central corpuscles, in uniting into filaments, or other forms, constitute the fibrine, which, as respects its constitution, is probably only a modified or more highly animalised albumen, which abounds more or less in the serum. When the coagulum of the blood is exposed to a stream of water, the colouring matter, detached from the central corpuscles, is washed away, whilst the corpuscles themselves remain aggregated in the form of fibrinous filaments. It is the various forms assumed by the aggregation or mutual attraction of the central corpuscles, in relation to the separation, deposition, or entanglement of the colouring matter, and to the appearances of the serum in which these changes take place, which constitute the phenomena of coagulation, and give rise to the appearances of the blood characteristic of inflammatory action. In addition to these facts, the following *inferences*, as to the causes of the phenomena of coagulation, may be abridged from my notes above referred to: —

27. 1. The globules of the blood possess a rotatory motion during life, this motion continuing until shortly before coagulation takes place. — 2. This motion is the consequence chiefly of the organic nervous or vital influence which is exerted by the ganglionic system on the heart and blood-vessels, and which is partially imparted to the globules. — 3. This influence thus preserves the blood in a state of due fluidity. — 4. The fluidity of the blood is hence a vital phenomenon, or property *derived* from, and depending upon, the vital conditions of the vessels in which, and the organs through which, it circulates; the vital conditions of the vessels and organs depending, as shown elsewhere, chiefly upon the organic nervous influence. — 5. The cause of the *coagulation* of the blood is not to be found in external agencies, but in the loss of the vital influence and motion of the globules, proceeding from the sources just assigned — the power exerted by the ganglionic upon the vascular system. — 6. The presence of air, particularly the oxygenous portion of it, and several physical and chemical agents, hasten coagulation, whilst others delay or altogether prevent it. — 7. When coagulation commences at any point of a mass of blood, it is rapidly propagated throughout the whole: rest favouring coagulation; whilst motion delays or prevents it. — 8. The heat of the body and the strength of the circulation are not causes of the blood's fluidity, but are both results of the same cause, namely, the vital energy of the vessels, and vital endowment of the globules of the blood: both are co-ordinate; and both, as well as the phenomena connected with coagulation, are dependent on this source. — 9. Coagulation occurs sooner in venous than in arterial blood; and coagulation of arterial blood is still longer delayed if it be prevented from leaving the arteries. — 10. Coagulation takes place the sooner after the blood is removed from the vital sphere of the system, the weaker the vital energy to which it was subjected whilst circulating in the system. — 11. The weaker the vital energy, and consequently, the quicker the coagulation, the more lax is the coagulum which is formed. — 12. Coagulation is more slow, and the coagulum more firm, the more energetic the vital action of the vessels. — 13. As the central corpuscles lose their coloured envelopes soon after their removal beyond the sphere of the vital influence of the vessels, and as this is the first part of the act of coagulation following the loss of motion of the globules, so it may be inferred, that the colouring matter continues to surround the central corpuscles in consequence of the vitality emanating from the interior of the vessels and endowing the globules; and that the separation of the colouring envelope from the central corpuscle is the result of the loss of a portion or of the whole of that vitality, and of the rotatory (1.) motion which it occasions; and, as the loss of vitality may be reasonably supposed to be quickest where it has existed in the lowest grade, the separation of the coloured envelopes, and the attraction of the central corpuscles forming the fibrine, will be the quicker, the weaker the vital energy, and *vice versâ;* but the coagulum will be the more lax or imperfect, as shown by the facts already stated (10, 11.). — 14. Although the loss of the rotatory motion and of the colouring envelopes of the globules disposes the central corpuscles to attract each other, yet the attraction is weak in proportion to the depression of organic nervous or vital power endowing the vascular system at the time when the blood is abstracted; and in some inflamma-

tions, as well as in some other diseases, the depression may be so extreme as to deprive the central corpuscles of all power of uniting in the form of fibrinous filaments. In such cases, these corpuscles merely mix with the serum like a gelatinous or albuminous matter, and either suspend the colouring substance, or allow its deposition to the bottom of the vessel; the central corpuscles separating imperfectly from the serum or combining with its albumen, or forming merely an almost colourless gelatinous mass in the upper parts of the coagulum. — 15. The firmness of the coagulum is in proportion to the degree of organic nervous influence endowing the vascular system, and to the emanation which the globules themselves derive from this influence.

28. From what is now advanced, the appearances of the blood in inflammatory and other diseases will be readily explained. When the organic nervous power is depressed or exhausted — as in asthenic inflammations, in typhoid and adynamic fevers, in the true infectious puerperal fever, and puerperal mania, in the worst forms of erysipelas and diffusive inflammation of the cellular structures, and in several other diseases, particularly when epidemic, or occurring in hospitals, the air of which is vitiated by crowding of the sick, and the decomposition of the discharges and secretions, as in lying-in hospitals — the blood taken from a vein will often not separate into a distinct coagulum and serous fluid, but will assume the appearance either of a black, grumous, sanious, semi-gelatinous mass, or of a straw-coloured jelly, at the bottom of which jelly the colouring matter forms a loose reddish brown, or blackish, stratum. In such cases, the blood, participating in the deficiency of the vital energy of the body, and being also, perhaps, deranged from the admixture of hurtful materials with it, which are not duly eliminated by the various emunctories, evinces the lowest grades of vital endowment — the attraction between the central corpuscles of the globules being too weak to form a coagulum and to exclude the serum, the colouring envelopes separating speedily from the central corpuscles, and forming a loose stratum at the bottom of the vessel.

29. It may be inferred, as corollaries from the foregoing, that the appearances which the blood exhibits have always an intimate relation to the vital conditions of the system, and to the excitement of the heart and blood-vessels; that the buffy coat is merely one of the manifestations furnished by the blood, indicating reaction of the powers of life, or excitement of the vascular system; that the blood participates in the vitality of the body, through the medium of the vessels and organs in which it circulates; and that, according to the degree or condition of this vital endowment, coagulation and the coagulum are modified in their phenomena and appearances, and the production of the buffy coat promoted or altogether prevented. (See art. BLOOD, § 81. *et seq.*)

30. ii. OF CHRONIC INFLAMMATION. — Inflammation may affect any tissue or organ in so mild and obscure a form from the commencement, as to proceed for a long and indeterminate period; and, in many cases, to escape detection for a long time, owing to the slightness and gradual progress of the phenomena constituting the inflammatory act. This may be termed *Primary Chronic Inflammation*. The chronic form of inflammatory action is, however, frequently observed to follow the acute disease; the latter, owing to diathesis, treatment, premature exposure, and to the operation of injurious agents before recovery had taken place, only partially disappearing, or degenerating into a milder and more prolonged state of action. This state may be called *Consecutive Chronic Inflammation*.

31. *A.* The *Local Symptoms* vary remarkably with the mildness or severity of the morbid action; for, as the term *chronic*, as well as *acute*, is merely conventional or relative, both marking extremes of action, between which every intermediate grade is to be found, each of the phenomena already described, as characterising sthenic inflammatory action, appears in different states of development in different cases and circumstances. Generally speaking, however, all the local symptoms are much less severe than in the acute disease, and sometimes so slight as to escape detection. — *Pain* is occasionally absent, or is so slight as not to excite attention. — *Redness* is also sometimes slight, or not very remarkable. — The *temperature* is not much elevated: it is often not above the natural standard. — *Swelling* is frequently slight, but it is sometimes very considerable; and throbbing is seldom complained of. — The *functions* of the organ, or part affected, are generally more or less disordered; but in some instances the disorder is slight, or even escapes detection. This is especially the case when a portion only of an organ or part is chronically inflamed. When an internal organ is thus affected, it is chiefly by the presence of disordered function, and by the constitutional or sympathetic effects of the morbid action, that the nature and seat of the disease can be detected.

32. *B.* The *Constitutional Symptoms* are often slight and obscure, — sometimes prominent and characteristic. — *Febrile symptoms* are not always present; and even when most manifest, they are rarely of a continued type. They are generally remittent, or almost intermittent; the exacerbations being preceded by languor, uneasiness, or slight chills, followed by increased frequency of the pulse, by thirst, dryness of the mouth, and heat of skin. These symptoms come on in the evening, impair the rest, and subside in the morning, either with or without perspiration. The general health is more and more impaired, the strength fails, the flesh wastes, and the complexion waxes pale, sallow, or unhealthy. If the generative or urinary organs are the seat of the disease, various nervous or sympathetic symptoms are present; and if matter forms, or ulceration takes place, the chills become more severe, the febrile exacerbations terminate in copious perspirations; the urine is thick after standing, or deposits a sediment; emaciation proceeds more rapidly, and hectic fever is established.

33. iii. PROGRESS AND DURATION.—The progress and duration of sthenic inflammation are influenced by the constitution or diathesis, habits of life, age, and sex, of the patient; by the structure or organ affected; and by the treatment and influences to which the disease is subjected. The sanguine and irritable temperaments, a full and robust habit of body, and youth or the vigour of age, not only impart a sthenic character to inflammation, but also cause it to assume an acute or active form, or to run its course rapidly. A

similar effect is favoured by parts which are naturally vascular, and supplied abundantly with nerves, or endowed with high sensibility, and especially if they be placed near the centre of the circulation. On the other hand, the melancholic leucophlegmatic, and nervous temperaments, the scrofulous diathesis, an advanced period of life, and the female sex, prolong the progress of inflammatory action, and cause it to assume, either primarily or consecutively, a latent, languid, or mild and chronic, form. Structures endowed with little vascularity, and with a low grade of sensibility, as tendons, ligaments, fasciæ, and bones; also parts far removed from the centre of vitality and of circulation, as the extremities, are most prone to inflammation of a slow and chronic character.

34. The patient's habits of life have a remarkable influence in determining the character of inflammation from the commencement, — in favouring the passage of the acute into chronic disease, and in disposing the latter to assume the former state. Full living, and the use of much animal food, or of exciting and intoxicating liquors, have these effects especially, and not only prolong or aggravate the morbid action, but also cause its unfavourable termination. Similar results are also produced by injudicious treatment; by exposure to a close, miasmatous, foul, or unhealthy atmosphere; by certain epidemic constitutions of the air, depending upon electrical conditions, or other circumstances; by mental anxieties and perturbations, and improper or premature exercise or excitement of the functions of the part affected. These not only prolong or aggravate acute inflammation, but also render its terminations more unfavourable than they otherwise would have been; and cause slight or chronic inflammatory action to pass into the acute and active state.

35. The circumstances just alluded to render the *duration* of sthenic inflammations quite indeterminate. The active and acute states may continue but a short period, — but two or three days, or even not so long, until one or other of the terminations about to be described takes place; and the slight or chronic state may endure months, or even years. Between these extremes, every intermediate term of duration, as well as grade of action, may be seen. The duration depends chiefly upon the organ affected; acute inflammation in vital parts, especially the stomach and bowels, terminating most rapidly.

36. iv. The Complications of sthenic inflammations deserve some notice, although hitherto the subject has received no attention from pathological and practical writers, owing manifestly to the "*verba magistri*," the dictum of Hunter, — that two diseases cannot co-exist in the same frame. This, however, does not apply to inflammations, and hardly to other diseases, not excepting even specific contagions. The one morbid action may mask or absorb the other; but the one that predominates has its principal features somewhat modified by the association. In cases of chronic inflammation, particularly in females, and in young or nervous subjects, the sympathetic disturbance produced by it, will often attract the chief attention of the patient, and also of the physician; and a disease, truly depending upon inflammatory action, in some one of its grades, may be viewed as nervous, spasmodic, or functional. This most frequently applies to inflammations of the uterine and urinary organs, of the cerebro-spinal masses, and of the digestive mucous surface; and is fully illustrated in the articles Hysteria, Hypochondriasis, &c.

37. When a vital organ is inflamed, either acutely or chronically, other parts sympathise more or less; and when the inflammatory action is slight, the affected organ may not manifest the disorder by characteristic phenomena, the sympathising parts actually presenting the chief disturbance. Parts, also, which were at first only sympathetically affected in their functions or sensibility, may either, from the severity, or from the continuance, of such affection, become more and more seriously diseased, until the structure is changed; and thus, what was merely a symptom, increases to a morbid association; and, lastly, to a true complication; or even, ultimately, becomes the principal disease, the primary inflammation subsiding, or entirely disappearing, as the consecutive complication is developed. Instances of this are not infrequent in respect of inflammations of the lungs, pleura, pericardium, and heart; the disease originating in either, and extending to the others; the primary affection being masked by the consecutive disorder, and sometimes ultimately absorbed by it. Such occurrences still more frequently take place when any one of the abdominal viscera is inflamed; two or more of them becoming consecutively affected, the disease either continuing for a time to co-exist in them, or disappearing from the one as it is developed in the others.

38. The complication of inflammations with each other, or with nervous, spasmodic, or convulsive disorders, or even with hæmorrhage, is much more common than is usually supposed, — the latter often depending upon the former, particularly when the inflammation is chronic, slight, or latent. In such cases, the passage of the disease into a more acute or active form becomes an advantage, by disclosing its nature. Such complications are frequent in childhood, and in females, particularly during the puerperal states. Many of the convulsive affections of the former derive their origin, in a large proportion of cases, from inflammatory action; and most of the nervous, spasmodic, painful, and hysterical disorders of the latter, arise from inflammatory action of a slight and chronic form in the uterus, ovaria, or urinary organs.

39. v. Terminations and Consequences.—Inflammation, correctly speaking, terminates only in *two* ways: in *resolution*, or the recovery of the healthy state of action; and in *gangrene*, or the death of the inflamed part. The other morbid conditions, improperly ranked as terminations, are merely *consequences* of inflammation, the morbid vascular action giving rise to them, still subsisting in most instances, in some one or other of its forms. — *A.* When inflammatory action terminates in *resolution*, the phenomena subside very nearly in the order in which they appeared. Pain ceases; the redness and heat diminish; the swelling subsides gradually, and the functions slowly return. In many cases, however, the swelling continues with little diminution for a considerable time, and the functions of the part are restored with equal slowness; the recovery of the impaired tone of the capillary vessels, and the absorption of the sero-albuminous fluid effused in the areolæ of the tissues, being

necessary to the subsidence of the swelling, and to the restoration of function. This termination may be looked for when the inflammation does not proceed too rapidly; when the pains are neither acute, lancinating, nor throbbing; when the symptomatic fever gives rise to a general and copious perspiration; and when the urine deposits a sediment.—*B.* The termination of inflammation in *gangrene*, is so fully discussed in that article, that nothing further need be advanced respecting it at this place. (See art. GANGRENE, § 3. *et seq.*)

40. *C.* Of the *consequences* or *results* of inflammation, the most important are—*exudation*, *softening*, *suppuration*, *ulceration*, *induration*, *thickening*, and, probably, other organic changes. Several of these are treated of in separate articles; a simple reference to which, at this place, will be sufficient. — *a. Exudation* or *effusion* is the earliest and most common consequence of inflammatory action; the swelling, constituting one of the chief characters of inflammation, being caused by it chiefly. Exudation is the deposition, in the areolar tissue, in the parenchyma of an organ, in a cavity, or upon some surface, in consequence of excited vascular action, of a fluid consisting chiefly of the natural secretion of the part, greatly increased in quantity, and remarkably altered in its properties and appearances. This exudation sometimes commences at a comparatively early stage; but most commonly it becomes abundant at an advanced period, or even towards the close, of the morbid action; and it occasionally favours a resolution of this action, but not infrequently some degree of inflammation still subsists with it. The fluid which is exuded or effused, varies in its characters with the structure affected, and with the degree or activity of the morbid action producing it. Something also depends upon the function of absorption in the part; for when it is active, and the more fluid parts of the exudation are thus removed, the state of the remaining parts will be thereby much modified. Hence the fluid is serous, sero-albuminous, flocculent, turbid, liquid, thick or partially consistent, ropy or glairy, coagulated, adherent, albuminous, or even membranous or fibrinous.—The fluid exuded in inflamed cellular or parenchymatous structures is generally serous, turbid, sero-albuminous, or flocculent, but becoming more consistent, albuminous, or otherwise changed, as absorption proceeds. That which is exuded from inflamed serous surfaces is either fluid and transparent, or turbid and flocculent, or thick, semi-coagulated, and albuminous; films or layers of lymph, or of albuminous matter, covering the affected surface, or agglutinating opposite parts. The fluid exuded from mucous surfaces varies in different situations, and as the follicles, or the mucous membrane itself is principally affected. Hence the morbid secretion is watery or thin; or mucous, thick, and opaque; or glairy, ropy, gelatinous, and transparent; or muco-puriform, or sanguineous; or muco-albuminous, or consisting chiefly of an albuminous lymph.

41. The intensity or activity of inflammatory action influences, not only the quantity, but also the nature, of the effused fluid. When this action is weak or slight, the fluid is chiefly serous; and in proportion as it is more active or severe, the effusion is more albuminous, and presents the characters of coagulable lymph. But the effused fluid is also much modified by the constitution, diathesis, and habit of body of the patient, and by the vital and physical influences to which it is exposed for a time after its effusion. When the fluid is retained for some time in contact with surfaces which exuded it, the more watery portion is absorbed, and the albuminous part, or the lymph, becomes more plastic and solid, and, ultimately, even organised. This is shown especially in chronic and sub-acute inflammations of serous membranes. Even in mucous surfaces, as in the fauces, larynx, and trachea, the albuminous fluid exuded during inflammation is changed, not only by a partial absorption, but also by the evaporation, during the constant passage of the air over the parts during respiration. The scrofulous, the gouty, and the rheumatic diatheses further affect the quality of the fluids effused from inflamed surfaces; but still more depends upon the intensity of the general vascular disturbance, in connection with the state of vital power. When the former is energetic, and the latter unimpaired, then the effused fluid is albuminous, and abounds in coagulable lymph, a *formative*, as well as a *reparative*, process, frequently resulting therefrom; a formative process often appearing from inflammation of serous membranes, and a reparative process after the division or wounds of parts. When the febrile and vascular disturbance is great, and organic nervous or vital power is much impaired, the fluid effused is watery, sanious, turbid, septic, offensive, &c.; the morbid action being incapable of effusing a fluid sufficiently coagulable to be the medium of adhesion between opposing surfaces, or to limit the spread of the morbid action to surrounding parts. Hence inflammation, in these circumstances, assumes the asthenic, spreading, and disorganising characters about to be considered. One of the chief and most important features of sthenic inflammation is its disposition to exude a fluid more or less coagulable, by which parts adhere and unite, and which even becomes organised, and arrests the extension of the inflammation, as well as limits the destruction or disorganisation of the parts in which it commenced.

42. Albuminous or coagulable matter exists in the fluids effused or exuded by sthenic inflammation in various proportions. In the more liquid effusion, it is in small quantity, and is separated from the serum which suspends it, or holds it in solution, by heat and by the mineral acids; but of the more solid or consistent exudation, it constitutes the principal part. Between these extremes it is found in every proportion. In puriform matter and pure pus, albumen exists in the form of minute corpuscles, or globulus, swimming in a turbid serous fluid. In this, as well as in the more fluid states in which albumen presents itself, it is incapable of organisation; but, in the more solid or plastic state, it often becomes organised, and is the bond of union between divided parts, when the powers of the constitution, and the condition of the circulating fluids, admit of its production. Salutary or reparative effects, from the effusion of coagulable lymph, are evinced also by its effusion around *abscesses*, by its agglutinating serous membranes, when morbid formations, ulceration, and purulent matter are about to perforate them; and by its obliterating arteries or veins, after ligatures, or in circumstances where dangerous hæmorrhage

would otherwise occur. (See Abscess, and Adhesions.)

43. *b. Softening* is a very general consequence of inflammation, and one of the earliest which attends it. Indeed, inflammatory action seldom continues long, particularly in an acute form, without impairing more or less the vital cohesion of the tissues affected. It often precedes suppuration, and it generally increases the disposition to effusion. It is most remarkable in mucous and cellular parts, and in parenchymatous organs, particularly the brain, lungs, liver, &c.— these becoming more friable as well as softer, than natural. But softening from this, as well as from other morbid conditions, is fully considered in the *article* devoted to the subject.

44. *c. Suppuration* is the natural result of inflammation, when it is allowed to attain a high degree of intensity, especially in cellular, parenchymatous, and mucous structures. — *Pus*, the product of the suppurative act, is apparently produced from the albuminous part of the blood, by an altered state of the vital condition of the capillaries. It is very difficult to show satisfactorily in what this alteration consists; but it probably is impaired tone, or deficient vital contractility, of the capillary vessels, the arterial branches supplying them being still more or less excited. Suppuration may be viewed as a true act of secretion; although pus, as it usually appears, is somewhat changed in the course of its production by absorption, by the vitality of the parts with which it remains in contact, by temperature, and by evaporation. The small whitish flocculent masses often found in the purulent matter, consist chiefly of a more concrete albumen secreted by the inflamed part. Although suppuration chiefly takes place in the structures mentioned above, yet it sometimes is seen in other parts, especially in the cavities of joints, and more rarely in serous surfaces. In these situations, particularly in serous membranes, it is generally a result of intense action in connection with deficient power.

45. Mr. Hunter was the first who recognised with any degree of accuracy the changes which take place in the blood, and in the capillaries of an inflamed part, during suppuration, inasmuch as he considered that pus was a remove further from the nature of the blood, than the matter formed by adhesive inflammation, — than coagulable lymph; and M. Gendrin is of the same opinion. The formation of pus in an inflamed surface or tissue takes place as follows, according to the observations of Kaltenbrunner, Gendrin, Carswell, and the author.—In the field of a microscope, the inflamed capillaries seem uniformly red, and the circulation in them is retarded or has ceased. Serum and coagulable lymph are effused in the areolæ of the tissue; and, if the inflammation is very intense, the exuded fluid is more or less coloured by the exudation of red globules or of blood. The whole of the inflamed part is quite opaque. As soon as suppuration commences, the red colour begins to disappear in various points, giving place to a yellowish granular-like matter in the capillaries, and connecting cellular tissue. In the centre of the inflamed tissue, several of the capillary vessels, which were obscured by the accumulated blood, re-appear, — some containing red, others yellowish grey, globules, which gradually become more distinct, increase in number and size, begin to move slowly, and, traversing the capillaries, arrive at the surface of the tissue, or at the edges of the solution of continuity, if this has occurred, in the form of globules of pus (Carswell.). Gendrin states, that he has distinctly seen the globules of blood, after stagnating in the capillaries of the inflamed part, losing their colouring envelopes, becoming opaque, and assuming a greyish yellow colour, approaching to that of pus; and that he has traced them moving slowly in the capillaries, and, as they advanced to the suppurating surface, gradually acquiring all the characters of pus. The observations of Kaltenbrunner agree with those of Gendrin, as to the transformation of the blood-globules into the globules of pus, and as to this taking place *within* the capillaries; but they also seem to prove, what I have observed in several instances, that the red globules, or blood, exuded in an intense state of inflammation into the areolæ of the tissue, undergo a similar change to that which takes place within the capillaries, when the circulation becomes stagnant in them; and that pus may thus be formed *without*, as well as *within*, the capillaries of an inflamed part, the fluid portion of the secretion consisting of the serum of the blood. Kaltenbrunner even supposes, that not only the blood of the inflamed tissue, but likewise a part of the tissue itself, is converted into pus-globules. But, I belive that this takes place only where suppuration is followed by *ulceration* (§ 48.), or where an ulcerated surface secretes a puriform fluid.

46. From these facts it is evident, that, in an inflamed part, certain changes precede the formation of pus: — 1st. A loss of the vital tone, or a change of vital action in the extreme capillaries; — 2d. A retardation or stagnation of the circulation, and partial coagulation of the blood in them; — 3d. A change of the blood-globules into pus-globules, and the discharge of the latter with a portion of serum on the suppurating surface; — 4th. A similar change of the globules of blood extravasated in the inflamed part, — these globules losing their colouring envelopes and becoming the globules of pus. As connected with the subject of suppuration, some notice might be taken of the presence of pus in the general circulation, or in situations remote from the seat of inflammation; but as this belongs rather to the translation and metastasis of inflammation—to consecutive inflammation, it will be considered hereafter.

47. *Pus*, or purulent matter, — the product of suppuration, — is a slightly unctuous fluid, of the consistence of thin cream, which it otherwise resembles. It is generally of a whitish or pale yellowish colour, and of a mawkish or sweetish taste. It is nearly inodorous when cold, but when heated, it emits a faint, sickly, and unpleasant odour. Under the microscope, it presents corpuscles or particles swimming in a serous fluid. These corpuscles resemble the central corpuscles of the globules of the blood, deprived of their colouring envelopes, and consist of a highly animalised albumen. The serous part of the secretion differs but little from the serum of the blood. In many situations, pus is mixed with the more natural secretions of the part; the latter being either altered in their characters, or increased in quantity. This is especially the case in acute inflammations of mucous surfaces; the fluid excreted consisting of pus and mucus in variable proportions. The

other relations of suppuration are fully considered in the article ABSCESS.

48. *d. Ulceration* is distinguished from suppuration chiefly in its being attended by a loss of substance — by a destruction of parts; and by a more or less abundant secretion of a puriform, ichorous, fœtid, sanious, and variously coloured fluid. It may immediately result from inflammation, or be consequent upon suppuration, or the formation of an abscess. It depends chiefly upon causes connected with the treatment of the part in the earlier stages of inflammation; upon the diathesis, habit of body, or existing constitutional vice, as scrofula, scurvy, syphilis; and upon the state of the digestive and excreting functions. Ulceration is always preceded by softening — by a loss of the vital cohesion of the tissue inflamed, at the surface or part most remote from the centre of circulation, or at the termination of the capillary vessels. Along with the softening there is also a more or less copious effusion or exudation of a serous fluid, in which the organic molecules, which have lost their vital cohesion, are liquefied or suspended. Hence the discharge is ichorous, offensive, sanious, or coloured. In the more rapid or phagedenic states of ulceration, and when the discharge is scanty, and in parts covering abscesses, very probably the organic molecules are absorbed nearly as fast as they lose that degree of vital attraction, necessary to their cohesion in the diseased surface. From this, the relation of ulceration to sphacelation and gangrene, particularly hospital gangrene, is apparent. (See art. GANGRENE.)

49. When an ulcerated part begins to return to a healthy state of action, the diseased secretion becomes more puriform or albuminous; and an attempt is made to restore the loss of structure by a process called *granulation.* The vessels of the ulcerated surface acquire a more sthenic action; the disposition in the tissues to lose their vital attraction or cohesion is arrested; and the secretion assumes at first a puriform, and afterwards an albumino-puriform, character; the albuminous or co-coagulable portion of the secretion coating the inflamed surface, protecting it, and ultimately becoming organised or partially identified with it. These changes in the ulcerated surface are evidently brought about by an improvement in the organic nervous influence of the part; and hence the success of a treatment, general and local, calculated to restore or to promote the energy of this influence, especially through the medium of the digestive and respiratory organs.

50. *e. Induration*, and *thickening* or *hypertrophy*, of structures, consequent upon inflammation, are discussed in the articles on these lesions. It is unnecessary to offer any further remark respecting them, than that they are generally consequences of chronic inflammation, and of acute or sub-acute inflammations which have passed into the chronic state. They may also be referred to the exudation, into the areolar tissue, of a sero-albuminous fluid, the more serous parts having been absorbed, and the albuminous parts organised, or assimilated to the structure including them. From this source other organic lesions may arise, according as the exuded matters undergo a more or less complete organisation, or according as they are retained in the state of merely minute amorphous masses disseminated in the areolæ of the structures, and are preserved from dissolution or change by the vitality of the surrounding parts. (See arts. INDURATION, and HYPERTROPHY; also DISEASE.)

51. II. VARIETIES OR MODIFICATIONS.—Having described inflammation, as occurring in a previously healthy constitution, or in its *sthenic form;* and having viewed this as the more usual and standard condition of the disease, whether appearing in the *acute*, *chronic*, or *intermediate* states; it becomes necessary to consider the *alterations or deflections from sthenic inflammatory action*, occasioned by the previous health, or the existing constitution, of the patient, and by the nature of the predisposing, the exciting, and the concurrent causes. Many of the lesions of vascular action arising from these sources are so different from the true sthenic condition now discussed, as to admit of doubts as to the propriety of viewing them as inflammations; yet they have intimate relations to the sthenic disease, inasmuch as they possess nearly the same local characters as it, and often in a very remarkable degree, — as they differ from it merely in kind, and often by slight shades only, — as they may be converted into it by a general and local restorative treatment, — and as the sthenic disease may be reduced to some one of these lesions by various depressing influences, or contaminating agents.

52. In the view just taken of sthenic inflammation, we have seen merely different *grades* of action; the disease being *acute*, or *chronic*, or some intermediate state usually called *sub-acute*, according to the degree of *severity* or of *activity* presented by the morbid action, relatively to the constitution and powers of the patient. Whilst the term *active* has been applied by many to the more acute states of sthenic inflammation, the word *passive* has been used as synonymous with the chronic conditions. To the former of these appellations, and to its application, little objection need be urged; but the latter is by no means applicable to any state of inflammation — neither to the chronic states of sthenic inflammation, nor to the *asthenic varieties* about to be considered.

53. With the increased local and general vascular action, constituting the states of inflammation above described, the constitutional powers are not much reduced or otherwise altered, nor are the depurating functions impaired, nor is the blood materially vitiated or deteriorated, in the early stages at least, or until the disease approaches an unfavourable termination. But in the varieties about to be noticed, the powers of life are much depressed or otherwise deranged from the commencement, the depurating or excreting functions are interrupted, the blood more or less altered, and the nervous sensibilities increased. Hence, vital resistance to the changes consequent upon increased susceptibility and diseased vascular action is greatly impaired, and disorganisation rapidly supervenes, and as speedily proceeds, unless arrested by the most efficient means. To these circumstances, however produced, are to be imputed those alterations, or deflections, from the sthenic or true form of inflammation, that frequently present themselves in practice, with characters varying with the cause and seat of the disease, and with the peculiarities of the patient. As the inflammations already described present no obvious loss of power in their earlier stages, or until their terminations, and are therefore justly termed *sthenic;* so those about to be considered

may be generally denominated *asthenic*, from the want of organic nervous energy, and the loss of vital resistance to the progress of disorganisation, which they usually present, unless controlled by judicious treatment. They have also been denominated *typhoid*, *venous*, *erythematic* and *erysipelatous*; but these are chiefly specific terms, the generic appellations, *spreading*, *diffusive*, *disorganising*, or *asthenic*, being more appropriate.

54. i. Of Asthenic Inflammations.—*A. Of the Local Alterations, or Characters.*—*a. Uneasy sensation*, or *pain*, is the earliest, and sometimes the most remarkable, symptom, particularly when serous membranes or circulating vessels are affected. When the disease is caused by external injury, by the inoculation of morbid matters, as in punctures during dissection, the pain is often early and acutely felt, even in cellular parts, although no other change has yet appeared. In nervous, susceptible, and weakened persons, the pain is so acute as to accelerate or increase the restlessness or delirium consequent upon the constitutional symptoms, which are often remarkably severe, compared with the apparent small extent of the local disease, especially when caused by an animal poison. Pain, however, is frequently not very severe in certain forms of asthenic inflammation, particularly when parenchymatous organs are their seat, and when they are consequent upon some disease, which has lowered or exhausted organic nervous power and sensibility. The inflammations which complicate or appear in the course of continued fevers, are illustrations of this; and the metastasis of erysipelas, or the transference of inflammation from an external part to an internal organ, seldom gives rise to much pain. The amount of uneasy sensation depends chiefly upon the tissue implicated, upon the exciting cause, upon the constitutional susceptibility of the patient, and upon the state of the blood. In cellular, mucous, and yielding structures, it is sometimes slight, particularly if the purity of the blood is impaired by imperfect excretion, unless the inflamed and turgid parts be partially strangulated by aponeurotic expansions or other unyielding textures, as in diffusive inflammation of the *cellular tissue*, and in various states of *erysipelas*. In this latter, and in inflammation of the lymphatics, the pain is generally tensive, burning, or stinging, and occasionally remittent. There are always great tenderness, and sensibility to the touch, unless the affected parts are deeply seated.

55. *b. Redness* and *vascular injection* are always very remarkable. The former often either rapidly passes into a deep, dark, brownish-red, livid, or purplish hue; or presents more or less of either of these from the commencement. It is sometimes of a pale or yellowish red tint. The vessels are injected and distended, and the current of circulation through them is slow, or impeded. The already dark hue of the blood is further deepened by this congestion; and the exudation of the serous portion of it is facilitated by the weakened state of the vital cohesion of the tissues, by the impaired tone of the capillaries, by the increased frequency of the heart's contractions, and by the diminished crasis of the blood itself. The discolouration and injection of the part in the various asthenic states of inflammation are generally indices of the extent to which the vital tone of the vessels and tissues is exhausted, and the blood, especially that circulating in the part, is altered.

56. *c. Increased temperature* is present chiefly at the commencement of asthenic inflammation, and when membranous tissues and circulating vessels are attacked. Even in these cases, at an early period, the actual rise of temperature in the affected part is often not greater than on the surface of the body generally. Where the febrile disturbance is great, the pulse very quick, and the skin dry, the heat of the general surface and of the diseased part is very considerable; but it is also peculiar, as observed in typhoid and malignant fevers; it seems to be greater than it really is, and is attended by a stinging, harsh, and unpleasant sensation. As effusion into the areolar tissue of the part proceeds, and as the swelling extends, little or no increase of heat is usually observed; and sometimes the temperature of the part may even be lower than that of the surface of the trunk, or even lower than natural.

57. *d. Swelling* is considerable, and sometimes very great, when cellular or parenchymatous tissues are affected. It is caused at first by the relaxation of the vital tone of the capillaries and tissues, and by the injection of the former; but consecutively, and chiefly, by the effusion of serum from the diseased vessels. The swelling is always diffused, is disposed to extend itself, and is never acuminated or convex. It is generally soft, sometimes boggy or œdematous, and never elastic or hard, unless from the tension occasioned by aponeurotic or unyielding structures stretched over the swollen part. In mucous and serous membranes, it is much less manifest, although existing more or less; and, in them, it is owing chiefly to the distension of the capillary vessels, and to the relaxation of the tissues themselves.

58. *e.* The *secretions* and *functions* are always disordered by asthenic inflammation:—the former are altered and generally increased in quantity; the latter are remarkably impaired. When a secreting membrane or surface is attacked by it, the discharge is variously changed from the healthy state, the change obviously arising from the impaired state of vital power, the morbid condition of the blood, and the acceleration of the circulation. The effusion generally consists of a foul, dark, turbid, ichorous, septic, sometimes whey-like, fluid. In puerperal females, it is often remarkably abundant, and contains much curd-like or semi-coagulated matter, partially separated from a turbid or whey-like serum. This watery, serous, or ichorous fluid, is also abundantly effused in the areola of the asthenically inflamed cellular tissue (see *Diffusive Inflammation of* Cellular Tissue); and, owing to the deficiency or absence of coagulable lymph or albumen, it readily spreads to, and infects, or contaminates, the surrounding tissues. This is one of the chief characters of asthenic inflammation; its *spreading* or *diffusive nature*, especially, resulting from the states of general or local vital power, and of vascular action, which are insufficient for the formation of coagulable lymph, by which the local disease may be limited.

59. The secretions from glandular organs are also remarkably altered in quality as well as in quantity; but their quantity is as often diminished as increased. Sometimes they are nearly or altogether suppressed, particularly in extreme cases

of the disease, manifestly owing to the loss of organic nervous influence or vital power, in connection with the distention of the capillaries. When the substance of the liver is the seat of asthenic or diffusive inflammation, bile is either not secreted, or is absorbed as soon as it is secreted, giving rise to one or other of the forms of JAUNDICE (§ 28.) described in that article as consequent thereon. The swelling, also, caused by the distention of the diseased vessels, and by the effusion into the parenchyma of the organ, is so great as to press upon the ramifications of the ducts, and to prevent the passage of the fluid along them as it is secreted. This is especially the case, when the secreting organ is inclosed in an envelope or membrane, which does not readily yield to the distension thus occasioned.

60. *B. The Constitutional Symptoms.* — Asthenic inflammations derive their peculiar characters, local as well as general, from either pre-existing disorder, or the poisonous nature of the exciting cause. The former consists chiefly of *debility*, as manifested in the assimulating, circulating, and excreting functions (see DEBILITY, § 12. *et seq.*). The vital powers are impaired throughout the frame, and especially in the organs of digestion, circulation, and depuration. Hence, with increased sensibility and susceptibility of the nervous system, the blood soon becomes affected, and is less suited for the production of a healthy secretion, and for the formation of coagulable lymph or albumen in the seat of inflammation, than in persons otherwise circumstanced. When asthenic inflammation depends upon the exciting causes, it will generally be found that they possess poisonous or contaminating properties which infect the frame, whilst they produce inflammatory action in certain structures by their specific operation, as in the infection of erysipelas; or which contaminate the system by acting directly upon the part with which they come in contact, as when a septic animal fluid, or an animal poison, is applied to a wounded or abraded surface. Very frequently asthenic inflammations derive their constitutional, as well as their local, peculiarities from both these sources, — from the previous state of health as well as from the nature of the exciting cause. In surgical practice, they not infrequently depend upon the severity of the shock sustained by the system, in cases of very severe local injury, as in extensive bruises and crushing wounds, or after operations. In all cases of asthenic inflammation, although the states of constitutional or vital power, and of the circulating fluid, are chiefly concerned in modifying the character of the local disease, yet the local, generally reacts upon the general affection, the one aggravating the other reciprocally and progressively, until either a fatal disorganisation, or arrest of function takes place, or a favourable change is brought about by energetic means. This is evinced especially in the diffusive visceral inflammations occurring in diseased or cachectic habits of body, or in the course of continued fevers, and in certain forms of erysipelas, and of inflammation of the cellular tissue.

61. The severity of the constitutional symptoms frequently has but little apparent relation to the extent of the local inflammation; the latter being comparatively slight, and presenting but little of the spreading, diffusive, or disorganising characters usually observed in connection with remarkable febrile commotion and vital depression. A person may experience a slight abrasion or puncture of the integuments, followed by inflammation to no great extent, with a more or less foul discharge, or with a discharge not materially different from that following sthenic inflammation; and yet the constitutional affection may be of the most violent description, and characterised by excessive vascular action, by great excitement and morbid sensibility of the nervous system, and by remarkable depression of nervous power and of vital resistance. It is this state of disease especially which Mr. TRAVERS has so well described under the terms *Direct and Reflected Constitutional Irritation* — terms which, in the present state of our knowledge, convey as satisfactory an idea of the nature of these causes, as any other that can be employed. The remarkable constitutional disturbance characterising them, has been ascribed to sympathy; and probably it may be produced in some instances by the absorption of a morbid or poisonous secretion or fluid into the circulation. But the majority, and these the most severe and the most marked, as to all the peculiarities of these maladies, can be ascribed only to a morbid impression or lesion of the organic nervous system, that is soon propagated throughout the frame, implicating not only the vascular system, but also the cerebro-spinal functions, and all the vital manifestations. So intense a disease, produced by so slight a cause, and depending, apparently, upon so small a local lesion, is, it is true, very inadequately explained by the terms *irritative fever* and *constitutional irritation*, and far less by that of *constitutional sympathy;* but the difficulty is, to denominate them by any other name which shall be in every respect appropriate.

62. The constitutional symptoms attending upon asthenic, foul, or spreading inflammations, appear variously grouped or characterised; but they may be referred chiefly to the following types or varieties: — 1st. General and remarkable depression of organic nervous or vital power, without vascular reaction; — 2d. General depression of vital power, with vascular reaction or excitement; — 3d. Vital depression, with acute nervous sensibility and cerebral disorder; — and, 4th. Vital depression, with remarkable nervous excitement and vascular reaction. — Although the constitutional commotion usually appears in one or other of these forms, yet it must be admitted, that the arrangement is somewhat conventional; that there are often intermediate, or mixed, states of disturbance; and that the general affection may commence in either of these forms, and pass into another, owing to the influences to which the patient is subjected in its course. Nay, fever attending sthenic or adhesive inflammation may be converted into either of these low types of fever, by the more powerful depressing or contaminating influences; and the latter may be changed into the former, by agents of an opposite nature, — similar alterations taking place, from the same causes, in the characters, consequences, and terminations of the local affection.

63. *a. General vital depression, without reaction,* is not of frequent occurrence, and is produced only by a very sedative or poisonous cause, relatively to the power of vital resistance, when depending upon a slight local lesion. It is very

frequently observed after severe shocks, crushing injuries, and operations. However induced, it usually commences with a sense of general coldness, sinking, anxiety at the epigastrium, nausea, occasionally vomiting, and remarkable despondency or depression of spirits. The skin is of the natural or of a diminished temperature; and there is generally little or no thirst. The mental faculties become obscured or stupefied, and the countenance collapsed; and convulsive motions or twitches frequently occur. The pulse is weak, irregular, small, or compressible — sometimes quick or intermittent, but always deficient in power. Vomiting is often attended by little retching, matters being brought up with a species of singultus; and the alvine excretions are always morbid and offensive. As the powers of life sink, low delirium, coma, the supine posture, hiccup, complete physical prostration, sharpened features, and a cold clammy state of the surface, supervene; the local disease either becoming more deeply discoloured, or extending towards the centre of the body, or passing into gangrenous disorganisation.

64. *b. Vital depression, with general vascular excitement and reaction*, is much more common than the preceding variety of constitutional affection. It is generally ushered in by chills or rigors — sometimes with nausea and even vomiting. The skin soon becomes hot, dry, burning, or harsh; but occasionally the affected part is hot and burning, whilst the temperature of the surface is very little elevated. The pulse is generally above 110°, and sometimes it is 120°, or even upwards; it is compressible, open, broad, quick, and irritable — becoming more so, and smaller or weaker, as the disease proceeds. The tongue is foul or loaded, sometimes glossy, and afterwards dry and mahogany coloured. The evacuations are offensive, and otherwise disordered. Medicines, or substances taken into the stomach, are soon thrown off; and there is generally thirst, which is at first urgent, but becomes less so, and is at last not complained of, particularly when delirium takes place. Delirium first appears at night, and either remits in the morning, or continues; and is often followed by coma. In some instances, the vascular excitement is most rapidly developed, or reaction speedily follows the rigors, and all the symptoms soon become severe; violent headach, with anxious collapsed countenance, succeeded by delirium, appearing early. In other cases, the general excitement is more slowly and more moderately produced, and not until several rigors and attempts at reaction have taken place. In either case, exhaustion speedily occurs, and all the symptoms of the advanced stage of the preceding variety supervene. The disease is rapid in its progress, if it be not early arrested by treatment; and the local alteration extends more or less, assumes a more livid or dark hue, or more aggravated form, or becomes more disorganised. When pus has been formed at an early stage of the local affection, and is confined in deep-seated parts, or beneath fasciæ, it is often offensive, discoloured, and different from that discharged after sthenic inflammation. In many instances, the local alteration is apparently slight, in relation to the severity of the constitutional affection; but in others it has extended to a very considerable distance along the absorbents, veins, or cellular tissues, from its primary seat; and has thus either been overlooked, or has infected the blood. (See arts. CELLULAR TISSUE — *Diffusive Inflammation of;* ERYSIPELAS; LYMPHATICS, and VEINS.)

65. *c. Vital depression, with acute nervous sensibility and cerebral disorder*, is very often observed to accompany asthenic inflammations caused by animal poisons and septic animal secretions, especially by the inoculation of either of them during the dissection of dead bodies. In all these, the pain felt in the seat of injury is most excruciating, and is attended by general irritability and impatience; by irregular chills, loss of appetite, intense headach, white tongue, thirst, anxious countenance, nausea, and sometimes vomiting; a frequent, small, quick, or irritable pulse; hot and dry skin; sleeplessness followed by delirium; and, lastly, a dry brown state of the tongue; vomiting, singultus, coma, subsultus tendinum, collapsed features, cold clammy perspirations, and quick, laborious respiration. The febrile commotion often commences insidiously, and without rigors or chills, and proceeds with much rapidity. In this variety, particularly when produced by the causes just stated, morbid sensibility, general irritability, violent headach, and want of sleep, early delirium, and suppressed, imperfect, or weak vascular reaction, are characteristic phenomena; the other symptoms being less constant. The local alterations generally consist of early and remarkably intense pain; excessive and spreading tumefaction; and of purulent formations, first on the seat of injury, but extending successively to parts nearer to the centre of the body, until the trunk and large cavities are reached. The cellular tissue, in the course of veins and absorbents, or around the glands of the latter, is most commonly attacked; and, ultimately, the serous envelopes on internal organs, or even these organs themselves, occasionally become implicated; but other parts, particularly the lymphatics, fasciæ, and veins, are often also affected.

66. *d. Vital depression, excessive irritability, violent pain, and vascular excitement*, often attend cases of asthenic inflammation, arising from similar causes to those inducing either of the former varieties of constitutional commotion; the difference in the degree of vital depression in the one, of nervous disorder in the other, and of vascular excitement in a third, depending chiefly upon the temperament, habit of body, vital power, age, and previous health of the individual, and upon the nature of the exciting cause. In proportion as the cause is of a poisonous, depressing, septic, or contaminating nature, relatively to nervous susceptibility and vascular activity, will the local affection be diffusive, spreading, or disorganising, and the constitutional disturbance be characterised by a predominance of the symptoms marking excessive vital depression, or acute nervous suffering, or tumultuous vascular excitement, devoid of the power of resistance. When the impression of the cause, or the subsequent influence of the local disease, depresses the vital energies beyond recovery, or the power of reaction, the extension of disorganisation, and the sinking of the manifestations of life throughout the œconomy, are remarkably prominent. Where either the cause or the local disease is less overwhelming, relatively to the state of constitutional power, reaction takes

place, and efforts are thereby made to resist the progress of the local and general mischief. Violent pain, and other severe nervous symptoms, whether occasioned by the nature of the exciting cause, or depending upon the state of the system, may attend any of the varieties of constitutional affection — either that of continued depression, or that of vascular reaction. Where the nervous sufferings are extreme, the vascular system usually evinces some degree of excitement, but it is often slight and without power. In certain cases, the reaction is as excessive as that marking the second variety of constitutional affection (§ 63.); is accompanied with the same symptoms, and runs a similar course; the only difference being in the greater affection of the nervous system than in it. In other cases, vascular excitement is not sensibly raised, unless in so far as the great rapidity of the pulse may indicate it, as in the third variety (§ 65.). In either case, the cerebral disturbance is great, and the disease tends rapidly to an unfavourable issue, if not arrested by active means.

67. If *blood* be taken in any of the varieties of asthenic inflammation, it either does not coagulate, assuming a treacly appearance, or it coagulates imperfectly, the crassamentum being loose; or the imperfect coagulum consists, in its upper half, of a mass resembling jelly in colour and consistence, the lower half containing the colouring matter. The blood, however, may present other appearances, particularly those already noticed, and those described in the article BLOOD (§ 110. *et seq.*). Venæsection, in these states of disease, is generally prejudicial, although, in some of the cases, where the vascular reaction is great, local depletions are often serviceable by unloading the distended capillaries, and diminishing local tension.

68. ii. PROGRESS AND DURATION. — *A.* The *course* of asthenic inflammations is usually acute; and, unless controlled by salutary agents, is generally to an unfavourable termination. Whilst these inflammations most frequently originate in causes which are septic or poisonous, and depressing relatively to the power of the constitution; they also sometimes follow the more sthenic forms of morbid vascular action, in consequence either of the exhaustion following excessive reaction, or of the operation of sedative influences or contaminating agents. Hence, persons affected with sthenic inflammation, especially of a part exposed to the air, will have it changed to the asthenic form, soon after removal to the crowded wards of an hospital, or to any impure or unhealthy situation; and a similar change will also occur in visceral or internal inflammations, from any depressing influence, moral or physical. On the other hand, *asthenic* inflammations are often converted into the *sthenic*, by restorative means acting upon either the respiratory or the digestive functions. Indeed, the principal indication of cure in the former, is to change them to the latter by such means; but, in order that this end should be accomplished, they must be energetically and appropriately employed. Repeated efforts at restoration, in respect both of the local lesion and the constitutional disturbance, are often made during the course of asthenic inflammation, especially when the treatment is only partially calculated to attain its objects; and the disease thus assumes a remittent appearance, and is much prolonged. When a morbid secretion, or fœtid pus, collects in a part which is deep-seated, although a favourable change may seem to have taken place, from the treatment, all the symptoms, local and constitutional, are sometimes speedily and unexpectedly aggravated, and the patient ultimately sinks. Occasionally, efforts at restoration recur oftener than once, before either recovery takes place, or death ensues. This is especially the case when the disease is caused by the inoculation of an animal secretion or poison; the inflammation extending along the cellular tissue, lymphatics, or veins, sometimes with occasional interruptions to its course, and with short ameliorations of the nervous and general disturbance, until the trunk of the body is reached, when all the symptoms become suddenly aggravated: vomiting, delirium, lurid and collapsed countenance, exhaustion of vascular and nervous power, laboured respiration, clammy perspiration, singultus, &c., appear, and the patient sinks.— Upon *dissection*, collections of fœtid pus, disorganisation of the cellular tissue, and lesions of the lymphatic and circulating vessels, are found extending to the central parts of the frame. The neighbouring cavities also contain effused fluid of various appearances, and the parenchymatous viscera purulent collections; the serous membranes being more or less inflamed, or partially adherent.

69. *B.* The *duration* of asthenic inflammations varies from a day or two to several weeks. It may not be longer than the former period in the puerperal state, and it may be prolonged to the latter in the recurring or remitting form of the disease. It is also often of very short duration, when caused by septic or contaminating animal matters. In many cases, however, when the spreading characters of the local disease, and the adynamic type of the symptomatic fever, have been arrested, a suppurative state of action continues for a considerable time, until more or less complete reparation of the affected part is accomplished. Indeed, this is generally the case when much disorganisation has taken place before the disease is arrested.

70. iii. COMPLICATIONS. — Asthenic inflammations frequently occur in the course of other diseases, particularly of exanthematic, continued, and adynamic fevers. It is chiefly when exanthematic fevers assume an adynamic form, that the inflammations which complicate them are truly asthenic. In the inflammatory type of these fevers, the associated local alterations possess more of the sthenic characters. The same applies to continued fevers; the adynamic species being those in which the asthenic states of local action, and of structural change, are chiefly observed. Indeed, asthenic inflammations frequently appear in the course, and even constitute a principal part, of all infectious, malignant, and contagious maladies. In these, they present, generally, modified or aggravated characters; but still they are merely varieties of this state of local morbid action, depending upon the specific nature of the cause, and of the constitutional affection. This is exemplified by scarlatina, small-pox, plague, &c. The course of most of these specific forms of asthenic inflammation is very acute; the complication often accelerating a fatal issue.

71. iv. TERMINATIONS and CONSEQUENCES.—*A.*

Asthenic inflammations *terminate*—1st, in a return to a healthy state of action;—2dly, in sphacelation or disorganisation; — and, 3dly, in dissolution without sphacelation, or without disorganisation so extensive as to be of itself productive of death.—*a*. *A return of the healthy state* of action is generally brought about by constitutional or local means, — by the former especially, or by both, — which are calculated to restore the vital powers, to impart tone to the relaxed capillaries and tissues, and to enable the part to secrete a more healthy pus, and to form coagulable lymph, by which the extension of the morbid action may be prevented. Thus it is necessary that the asthenic state should be changed into the sthenic before restoration can be accomplished; and this can be affected only by such means as will change the constitutional commotion from the adynamic type, — as will give energy to the organic nervous system, at the same time that they restrain excessive vascular action. As soon as the local disease and accompanying fever assume the sthenic conditions, reparation commences, and recovery takes place, as in these inflammations (§ 39.).

72. *b. Sphacelation* or *disorganisation* of the affected part may take place in very various grades. After the occurrence of either, the inflammation and disorganisation may cease to extend; the local action and febrile commotion may gradually or quickly assume a more sthenic character, particularly under restorative influences; the sphacelated portion may be thrown off, the disorganised part repaired, a suppurative action set up, and coagulable lymph thrown out around the seat of suppuration, whereby the surrounding structures will be protected, and the diseased parts more or less restored. Very frequently, however, when asthenic inflammations terminate in this way, the local mischief increases rapidly, and the general disturbance is aggravated, until life is at last extinguished. In these cases, the destruction of parts, either by sphacelation, or by phagedenic or sloughing ulceration, is generally so extensive, as to be incompatible with the continuance of life; but in those next to be noticed, the destruction of parts is not of itself sufficient to produce death.

73. *c. Dissolution, without sphacelation, or disorganisation,* so extensive as to account for the occurrence, is not an infrequent termination of asthenic inflammations. In such cases, the local affection is either merely the local manifestation of a severe constitutional malady, or is attended by a state of vital depression or exhaustion so extreme, as to terminate life, before it had advanced to the changes constituting actual disorganisation. In some of these cases, the result depends chiefly upon the morbid impression first made upon, and continuing to influence, the organic nervous energy, and in others it is partly owing to the morbid state of the blood, arising either from the same source, or from contingent circumstances or changes. When serous or mucous membranes are the seat of asthenic inflammation, a fatal termination is owing rather to the vital depression consequent upon the extent of surface to which the morbid action has been extended, than to the amount of disorganisation. This is evinced in many cases of general *peritonitis*. When a mucous surface engaged in the performance of vital actions is the seat of the disease, the powers of life often sink rapidly, both from the extent of surface affected, and from the interruption to the functions performed by it. This is shown in general *bronchitis*, and in certain states of *influenza*. Illustrations, moreover, of this termination of asthenic inflammations are often furnished by certain of the forms of disease caused by poisoned wounds, or by local injuries, and by some cases of *puerperal disease*, and even of *erysipelas* *, particularly when occurring in an infectious or epidemic form.

74. *B. Consequences.*—Asthenic inflammations give rise to certain changes which differ in some respects from those attending the sthenic form of the disease. It is necessary in practice to be fully acquainted with the differences between the results of both states of inflammation, especially as they are often so slight as to be overlooked, and as these results are generally essentially the same, but modified in character and in the period of their appearance.—*a. Effusion* of serous fluid is a very early consequence of asthenic inflammations. In parenchymatous or cellular parts it produces the extreme swelling (which is in some cases and situations œdematous or quaggy) attending the disease; and, in serous membranes, it often takes place to a great extent, and is in all respects an *effusion*, rather than an *exudation*. The appearance of the effused fluid varies much with the state of the disease, and with the degree of vital power and vascular reaction. In proportion as power is depressed, is the effused fluid ichorous, foul, abundant, and dark or discoloured; probably from some of the blood-globules, or of the colouring matter, having been effused with the serum. Hence it is, in some instances, almost sanguineous. As vascular reaction is increased, the fluid is turbid, flocculent, sero-albuminous, or sero-puriform; the situation and other circumstances attending upon the effusion modifying its character. The puerperal state, and the persistence or suppression of the discharges and secretions attending this state, modify remarkably the characters of the effused fluid, as in the asthenic peritonitis associated with adynamic puerperal fever. The fluid effused from the mucous surfaces is also much modified from that exuded during sthenic inflammatory action: it is usually less mucous and less albuminous, and more watery, serous, ichorous, or sero-sanguineous, as in cases of adynamic DYSENTERY (see § 26, 27.). It is sometimes glairy as well as watery; and when vital power is extremely depressed, it is very dark-coloured, offensive, and sanious. When sthenic inflammation passes into the asthenic state, owing to failure of the powers of life, or to morbid states of the blood, the effused fluids also pass from a consistent and coagulable, to a fluid and ichorous, state. The fluid, effused during asthenic inflammation of cellular parts, also partakes more or less of the characters just mentioned. It is deficient in albumen or coagulable lymph, and hence more readily infiltrates the surrounding tissues; and when it is of an ichorous nature, it seems to contaminate the parts to which it extends. Thus asthenic inflammation of cellular tissues is never limited by the effusion of coagulable lymph, unless a change be

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* In 1836, erysipelas prevailed most generally and fatally in the Orkney Islands. Its infectious nature was fully demonstrated on many occasions. It assumed a low or adynamic form, and the deaths from it were more numerous, for the period of its continuance, than from any other disease that had prevailed within the memory of the oldest practitioner.

produced in the general and local disease by means hereafter to be pointed out; and then lymph is formed around the seat of morbid action, agglutinating the areolæ of the tissue, and becoming a barrier between the morbid matters effused in the central diseased parts, and the healthy structure.

75. *b. Softening* is the next early consequence of asthenic inflammation, and one of the most remarkable. It is evidently owing to the extreme prostration of vital power in the part, causing a loss of the vital cohesion of the tissues, progressive with the disease. I have seen the softening so extreme, that the structures have been torn with the utmost ease after death, although the examination was made whilst the body was still warm. When this state of morbid action affects cellular and mucous parts, the softening and want of cohesion are equal to that of wet bibulous paper. They are often also very remarkable when the serous membranes have been implicated. In some cases of infectious puerperal fevers, complicated with asthenic peritonitis and hysteritis, I have found the peritoneum, and even the substance of the uterus, not only discoloured, but so softened as to be torn with the utmost ease.

76. *c. Suppuration* of a truly restorative nature is met with chiefly when the morbid action verges towards the sthenic type. Purulent matter is frequently found in parts asthenically inflamed, and is often secreted from surfaces thus affected; but it is generally offensive, and otherwise modified from that described above (§ 47.). It is often tinged, particularly in cellular and mucous parts, with the colouring substance of the blood. As the puriform matter, secreted by this state of action, is not confined from the adjoining structures by the effusion of coagulating lymph, and by the cysts thereby formed, it is frequently partially absorbed into the circulation. It thus contaminates the blood, and aggravates both the constitutional and the local disease, — rendering still more morbid the secretions and excretions, as well as the discharge from the seat of inflammation. When the matter passes to a more perfect pus, the change depends upon an improvement in the local and general action, and is an indication of commencing restoration, if unfavourable influences do not come into operation. Mucous and serous membranes often secrete a puriform fluid, presenting characters, varying with the states of vital power and of vascular action, when asthenically inflamed, and generally in a very large quantity. The asthenic bronchitis attending severe cases of *influenza* generally gave rise to a copious secretion of a thin muco-puriform fluid; and the effusions into shut cavities, in some cases of complicated erysipelas, of puerperal fever, &c., consist of a sero-puriform matter, occasionally tinged with blood, or otherwise modified.

77. *d. Ulceration* from asthenic inflammation is characterised by a rapid loss of substance, and its consequent extension. The edges and bottom of the ulcers are softened; sometimes not materially, if at all, elevated; and occasionally not much discoloured, or even inflamed. In other instances they are foul, dark, phagedenic, or sloughing. The discharge from the ulcers is usually ichorous, sanious, sometimes slimy and watery, and always offensive. The loss of substance is in them more owing to deprivation of the vital cohesion of the tissues at the diseased surface, and to the liquefaction or admixture of the dead molecules in the fluid discharge, than to absorption; which, however, takes place to some extent. When the ulceration is sloughy or gangrenous, and the discharge copious and very offensive, it is chiefly owing to the former. In some of these cases, the loss of vital power and cohesion is much more rapid than the solution of the molecules in the discharge, and then large sloughs cover the ulcerated parts. In some instances, the sloughy appearance proceeds from the more consistent or albuminous portion of the discharge having attached itself to the surface, whilst the fluid part either is dissipated by evaporation, or has passed off. This, however, is observed chiefly when a change to a more sthenic action takes place in the inflamed tissues. When absorption proceeds rapidly on the ulcerated surface, the constitutional symptoms are thereby greatly aggravated, and an unfavourable termination accelerated. Asthenic inflammations of the mucous surface, and particularly of that of the bowels, are often followed by ulceration, which occasionally presents a sloughing or phagedenic appearance. (See DYSENTERY, § 54. 56.)

78. III. MODIFICATION OF INFLAMMATION BY STRUCTURE. — Inflammation has been considered above, chiefly with reference to vital power and vascular action, without, however, overlooking the modifications depending upon structure. On this latter part of the subject, a very few general remarks may yet be added. — Dr. C. SMITH first ascribed the differences of inflammation to differences of tissue; and the writings of BICHAT, PINEL, BÉCLARD, GENDRIN, and others, have tended to give very general currency to these views, and to carry them much beyond their legitimate value. Structure certainly modifies, not only the course and terminations, but also the results or products of inflammation. But still the chief sources of difference are, the states of vital power and of vascular action. Besides, inflammation of an organ or part is not limited to a single constituent tissue of that organ, although it may have originated in one tissue only. It usually implicates two or more; although the cellular tissue, being, as it were, the matrix of the rest, is that chiefly affected. When inflammation thus extends to different textures, its characters, terminations, and consequences are modified more by the vital conditions above insisted upon, than by differences of structure; and, even when very differently organised parts are affected, the consequences of the morbid action in all of them are often very nearly the same, and are obviously owing chiefly to the states of vital power and vascular action. Even when mucous or serous surfaces are inflamed, the morbid action is seldom confined to them, the connecting cellular tissue being more or less implicated, and frequently also the adjoining structures; but the results and terminations of this action chiefly depend upon the constitutional affection; or, rather, the local and the general disease are both consequences merely of the morbid states to which they have been just ascribed, and are hence more intimately dependent upon them than upon other circumstances. In the present day, so much has been imputed to structure and to its modifications, natural and morbid; and alterations of function, of

sensibility, and of action, have been so generally connected with lesions of organisation, both by teachers and writers, as to mislead those who are seldom at the trouble of thinking, for themselves, or of attending to the suggestions of common sense in medical observation and reasoning. Organisation, function, and disease are so frequently viewed in connection; and function is so generally considered as resulting from structure, and disease from alterations of structure, that the principle which not only endows, and regulates, and controuls, and ultimately arrests, the functions, but also alters the whole organisation, is left out of the question; and the results of observation in respect of its various conditions and agencies — the circumstances which modify these conditions, and which change its manifestations in the various organs, either from healthy to morbid states, or from the latter to the former — are either insufficiently appreciated, or entirely neglected. Too much is ascribed to the material and gross effects, whilst the conditions out of which they arise are kept out of view, in respect both of their primary operation, and of their continued influence.— It is unnecessary to add any thing to what is advanced on the modifications of inflammation by structure, in the various articles where the pathology of the different tissues and organs is fully discussed.

79. IV. DIAGNOSIS.— *Inflammation may exist in internal parts without being evinced by the usual local and general symptoms; and the parts affected by it during life may present very few or even no indications of it after death;* whilst *some affections closely resemble inflammation, and certain appearances very nearly approach those produced by it in the tissues.* To each of these points the *diagnosis of inflammations in general* has especial reference.

80. *A.* Inflammation may be so *latent*, or so *obscure*, owing to the absence of the most important symptoms, and to its seat, as to be recognised with great difficulty. The more slight and chronic forms of inflammation are those most frequently latent or concealed; yet, the most acute states, especially of an asthenic form, and occurring in states of the system characterised by impaired sensibility, or in viscera whose organic sensibility is naturally low, are often latent or obscure. These *concealed inflammations* have been noticed by HOFFMANN, BAGLIVI, STOLL, WEINHOLT, MAYER, MECKEL, REYLAND, and HARTMANN, and been frequently observed in certain epidemics. They are more common in some organs than in others, especially in the course of adynamic and typhoid fevers, and in other complications. Although they may be expected to exist chiefly, if not altogether, in parenchymatous structures, where the organic sensibility is the most obscure, yet they are not infrequent in serous and sero-fibrous tissues, which are usually acutely sensible in the inflamed state. A morbid condition of the blood, as well as a generally impaired state of sensibility, seems to diminish sensibility in inflamed organs; for the *consecutive* or *secondary inflammations*, which proceed from pre-existing inflammation or disease, are commonly latent or concealed. — *a.* Epidemic fevers are very frequently complicated with acute asthenic inflammations, which seldom betray themselves during life, owing both to the depressed state of organic sensibility, and to the condition of the blood. The brain, the lungs, the liver, the kidneys, the digestive and the respiratory mucous surfaces, are the most liable to be thus affected, without indicating, upon the strictest examination, the extent of mischief; even auscultation, percussion, and pressure, often failing in furnishing the usual evidence of it. Inflammations, however, of the respiratory organs would much more frequently be concealed, if these means of investigation were not resorted to. Indeed, in fever, in influenza, and in various epidemics, pneumonia would almost always be concealed without these aids. Inflammation of the abdominal viscera, during these and other maladies, often, also, does not become manifest, unless upon the strictest examination of the stools, the urine, and the patient's position in bed; and upon the closest observation of the effects of pressure, &c.

81. *b.* Inflammations of serous and sero-fibrous structures are not infrequently latent, especially when they commence gradually and proceed slowly, or when they appear under the same circumstances as have just been mentioned. Pleuritis and pericarditis, in chronic forms, and as complications of febrile or epidemic maladies, are often concealed; and, although less frequently so when auscultation and percussion are employed, yet they often escape detection, especially when they give rise to little effusion, until disclosed by examination after death. The same is observed, although much less frequently, with respect to peritonitis, which, however, often supervenes in more or less obscured states in the course of adynamic fevers.— *c.* Concealed or obscure inflammation of mucous surfaces, especially of the digestive, is remarkably common. Many of the disorders attributed to disturbed function merely, are actually slighter states of inflammation. But much more severe and even acute forms of the disease may exist in this tissue, without the usual evidence of them having been furnished; and may run on to disorganisation and even to death. This, however, chiefly occurs in the course of continued fevers, and in the other circumstances just mentioned.

82. *B.* Various *febrile diseases*, and *painful* and *spasmodic affections*, so closely resemble inflammations as to be distinguished from them with difficulty. — *a.* Several internal inflammations are liable to be mistaken for the more *sthenic forms of continued fever;* and that is the more likely to occur when the latter become complicated, particularly at an early period of their course. But internal inflammations, especially those of a sthenic character, present, amongst the earliest phenomena, some, at least, of the principal symptoms of inflammation, even before the chills or rigors take place, which usually attend their development. The disease is strictly local from the commencement, and is not attended by the vital depression, and loss of muscular power, which not only accompany, but also precede, idiopathic fever. In the former, the fever is sympathetic of, and contingent upon, the local affection; in the latter, the inflammatory complication is a contingency or accident, arising either soon after the commencement, or in the course of the constitutional malady.

83. *b. Painful affections* of internal or concealed parts are liable to be mistaken for in-

flammation. But violent pain is not always an attendant upon inflammatory action, and unless in very acute cases of pleuritis and peritonitis, the pain of inflammation is seldom so severe as that which is dependant solely upon nervous disorder. It is only when the pain is attended by increased vascular action and heat of skin — by symptomatic fever, or, at least, by some degree of vascular excitement; by heat or tension in the vicinity of the pained part; and by a white, loaded, furred, or excited state of the tongue, and high-coloured urine; and when it is increased by pressure; that it becomes an indication of inflammation. The pain of nervous disorder is intermittent or remittent; it often suddenly ceases for an indefinite time, and as suddenly re-appears. It is not attended by a sense of burning, or of heat or of throbbing, and it is generally eased by firm pressure; whereas the pain of inflammation, when severe, becomes gradually so, is continued, although often exacerbated at times — is frequently throbbing, and is always associated with very marked disturbance of the functions of the pained part.

84. *c. Spasmodic disorders* are often referred to inflammatory action; and about twenty-five years ago, when blood-letting was the alleged cure for every thing, and for these disorders especially, they were firmly believed to proceed from this source. However, like painful affections, they are more frequently purely nervous, or independent of inflammation. It is true that they may be complicated with one or other of its forms, and that either painful or spasmodic affections may proceed from congestion, or active determination of blood to the organs thus affected, or to parts in their vicinity; but still these are not inflammation. Both classes of disorder most frequently proceed from some unnatural excitement or irritation at the origin, or in the course either of the nerves supplying the painful or convulsed part, or of those connected with them. Thus irritation of the intestinal or uterine nerves will produce pain or spasm, or both, in remote parts, by their *direct* and *reflex sympathy:* and the irritation of calculi in the kidneys will occasion colic by the *direct sympathy* of the ganglial nerves, and pain or spasm of distant voluntary parts, by the *reflex sympathy* of the cerebro-spinal nerves. (See *Direct and Reflex Sympathy*, in my Edition of Richerand's *Elements of Physiology*, edit. 1824, and 1829, p. 546.)

85. *d. Determination of blood* to particular organs may also be confounded with inflammation; and it may run on to the more sthenic forms of the disease, either in acute or in chronic states. But care should be taken to distinguish between them. I have, in the article Blood (§ 25.), entered fully upon the consideration of *local determination of blood*, and upon the differences between this affection and *inflammation;* and have shown, that whilst the *first* of these consists only of augmented circulation and functions of a part, and is unattended by symptomatic fever, or any other alteration, the *second* is an actively morbid state of the organic nervous influence, and of the vessels of a part, accompanied by symptomatic fever, and tending generally to change of structure, and often to disorganisation. In the *former* the functions are usually increased, or inordinately excited, the organic sensibility being either unaffected or not sensibly excited; in the *latter* the functions are rarely increased, but always much deranged, or entirely suppressed — organic sensibility being early excited or disordered, and generally sensibly disturbed. (See art. Blood, § 25—33.)

86. *e. Congestion of blood* in one or more organs has also been mistaken for inflammation, both during the life of the patient, and in examinations after death. In the article Congestion, I have defined it to be deficient vital tone or power, chiefly of the veins of an organ or part, occasioning accumulation of blood in them, and a languid or retarded circulation, the functions of the organ being thereby proportionately disordered. The pathological relations, terminations, appearances, and symptoms of this form of disorder, are there so fully described, that it is unnecessary to notice, at this place, the distinctions between it and inflammation, farther than that, in the *former*, the functions of a part are generally more or less impaired, without the organic sensibility being morbidly excited, and without symptomatic fever being present; in the *latter*, there is not only disturbance of functions, but also exalted or disordered sensibility and vascular action, and more or less febrile commotion. The one is a morbid state of the capillaries and arteries, originating in the organic nervous influence of a part, with which state the system generally sympathises; the other is an engorgement of the veins, sometimes extending to the capillaries, owing either to a mechanical obstruction to the return of blood through the former, or to deficient vital energy of the affected organ. — The blood in congested capillaries and veins is of a purple or black hue; whilst that in the capillaries of inflamed parts is much more red or florid. (See art. Congestion of Blood.)

87. C. There are *certain appearances observed after death*, which are often difficult to be distinguished from those consequent upon inflammation. — *a*. The *congestion of blood* from mechanical obstacles to the circulation in the veins will not be mistaken for inflammation, if the exact state of the congested tissues, and if the course of the venous trunks, be carefully observed. It is in mucous membranes especially that the diagnosis is at all difficult, and in them only when the redness presents a ramiform appearance. In congestion from this cause the veins are full, often tortuous, and rarely varicose, — states not existing in inflammation; and the obstruction is commonly organic disease of the liver, or of the heart, or of the lungs, or the pressure of some tumour on large veins. Mechanical congestion sometimes, however, gives rise to inflammation, or is associated with it, and then the difficulty of diagnosis is much increased; but the state of the tissues, the capillaries of which are thus congested, and the presence of one or other of the usual consequences of inflammation, will generally lead to a correct conclusion. Dr. Macartney mentions, in his work on *Inflammation*, which appeared as this article was passing through the press, that the arteries of a congested part are smaller than natural, and that he verified the fact by experiments; the corresponding arteries to the veins, which were congested by tying them, being very much reduced in size.

88. *b. Congestion from position or gravitation* is much more likely to be confounded with inflam-

mation, than that produced by mechanical obstacles; but attention to the relative situation of the congested part, especially with reference to a depending position and gravitation of the fluids, will generally aid the observer. When congestion of the capillaries is present, where gravitation could not aid in causing it, and when there is no manifest mechanical obstruction of the veins, it must be ascribed to inflammatory action, although the usual consequences of such action are absent, for the inflammation may have been too recent to have given rise to them.

89. *c. Redness from inbibition*, or from the dyeing of the internal coats of vessels by the colouring matter of the blood is sufficiently discussed in the article on *Diseases of* ARTERIES (§38.). It is of a scarlet red; is limited to the lining membrane of the vessels; and is unconnected with any change in them, or with any capillary injection, or congestion of the vasa vasorum: whereas inflammatory redness in the internal surface of vessels is less uniform than it; is more dull or pink coloured; extends to all the coats, although in different degrees; and is accompanied with capillary injection, with softening and opacity of the inner membrane, with thickening, serous infiltration, &c. of all the tunics.

90. *d. Inflammation sometimes leaves no marks of its existence after death.*— This occurs chiefly in the inflammatory affections of the skin, and in slight or incipient inflammation of serous membranes. But the redness attendant upon the disease is more frequently diminished after death, than altogether banished. The inflammatory redness of the skin, and mucous and serous membranes, attending the exanthemata, and continued fevers, often partially or wholly disappear after death: yet these structures present appearances which may be inferred to have resulted from inflammation, and to have been associated with redness and vascular injection during life, even although the fact had not been demonstrated to the senses. When the skin has been affected, it usually assumes a purplish hue in the seat of affection, and the cohesion of the cuticle to the subsequent tissue is early diminished, so that it soon may be detached with ease. The vital cohesion also of mucous and serous membranes is impaired more than is usually observed, although all redness has disappeared, and, in these parts, as well as in the skin, and cellular tissue, decomposition makes a more rapid progress than in the healthy structures. Vascular injection and redness may have vanished more or less, even in situations, and in forms of inflammation, where some one of the usual consequences of the disease is present. In this case, however, there can be no doubt of its nature.

91. V. CAUSES OF INFLAMMATIONS.—i. CONSTITUTIONAL AND PREDISPOSING CAUSES.—*a. Age* has considerable influence upon the production and progress of inflammation. The disposition, particularly to the more sthenic and acute forms of the disease, is greatest in childhood and youth. It may be said to diminish gradually from infancy to old age, whilst the more chronic and asthenic states become more frequent as age advances. The brain and membranes, the lungs and mucous surfaces, the skin, the serous surfaces within the thorax, and the glands, are the most frequently affected in children and young persons; and the digestive, respiratory, urinary, and generative organs, at more advanced epochs of existence, and generally in the order in which they are here enumerated.

92. *b. Sex* has but little influence in predisposing to inflammation. Males are more frequently affected, chiefly because they are exposed more than females to other predisposing, and to many of the exciting, causes. Females are most predisposed to inflammation at the commencement, during the continuance, and for some time after, the disappearance of the catamenia, and during the puerperal states, especially after parturition.

93. *c.* Of *temperaments* and *diathesis*, the most influential are the sanguineo-melancholic and irritable; the scrofulous, gouty, and rheumatic. It is chiefly owing to the descent of temperament and diathesis to the offspring, that inflammations sometimes present an *hereditary* tendency.

94. *d. Habits* and *modes of life* dispose to inflammations of various organs. Persons who are exposed to the open air, and to atmospheric vicissitudes, or who take active exercise in the air, are liable to inflammation of the respiratory organs; and inflammatory diseases generally assume a sthenic or acute character in them. Those who are indolent, sedentary, or confined to warm or close apartments, and unhealthy localities, are most subject to inflammations of the digestive, parenchymatous, and excreting viscera, particularly the excreting organs in the abdomen; the morbid action very frequently assuming either asthenic or chronic forms. — The influence of *modes of life* in predisposing to, and exciting, inflammatory maladies, is fully shown in the article on ARTS AND EMPLOYMENTS.

95. *e. Food and drink.* —The liberal use of animal food favours the occurrence of every form of inflammatory action, or generates an inflammatory diathesis. It is even very probable that certain kinds of animal food predispose to morbid vascular action in some structures in preference to others. The frequent or habitual use of pork seems to dispose chiefly to inflammations of the glands, joints, and bowels; and aids in generating a scrofulous diathesis. The laws of MOSES, with reference to animal food, have evidently had a salutary influence in rendering scrofulous, gouty, and inflammatory diseases less frequent among the Jews than in any other class of the community. In warm climates especially, the use of pork, and of the viscera and blood of animals, cannot fail of being prejudicial; and there cannot be a doubt that the proneness to inflammations among Europeans, in hot climates, arises chiefly from the quantity of animal food and exciting liquors consumed by them. Persons who live much upon fish are liable to inflammatory affections of the skin and digestive mucous surface; and, whilst flesh meats favour, in temperate climates, a sthenic form of inflammatory action, living much on fish disposes chiefly to the more asthenic and chronic states.

96. Exciting or *intoxicating beverages* predispose to, and often directly excite, inflammation, particularly of the digestive and urinary organs. The habitual use of these liquors frequently induces and keeps up morbid vascular action, chiefly of these parts, of a sub-acute or chronic kind, generally passing into confirmed structural change. These effects most commonly follow the use of spirituous liquors; and, next to these, new wines

and malt liquors are most prejudicial. Persons who use much of the former soon become subject to enlargements and obstructions of the abdominal viscera, consequent upon repeated or protracted inflammatory action; and those who drink the latter in large quantities, and who, at the same time, are very actively employed in the open air, as coal-heavers, draymen, &c., are liable to the most acute attacks, often attended by the most violent constitutional commotion, and terminating rapidly in disorganisation of the inflamed part.

97. *f. A plethoric habit of body,* — the more immediate consequence of diet and regimen, — remarkably favours the occurrence of inflammations. Persons who live fully, and take insufficient exercise, are extremely prone to these diseases, when exposed to atmospheric vicissitudes, and to cold, particularly if the body is quiescent, as when a person is carried rapidly through the air in an open carriage. Persons in large towns or cities, accustomed to warm close rooms, or engaged in sedentary occupations, and living fully, when called to a distance, often travel on the outside of coaches, or in open carriages, and are surprised when they are attacked by inflammations, the slighter forms and earlier stages of which they usually neglect. The surprise would have been, if they had escaped. In the article Blood, where the subject of vascular plethora and determinations of blood are discussed (§ 13. *et seq.*), I have shown how much fulness of the vascular system disposes to inflammatory action, and how frequently the latter follows as a consequence, or as a higher grade, of the former. When this system is overloaded, some part is liable to experience over-distention and augmented flux, which often soon passes into morbid action, the balance of circulation being readily disturbed by external and internal — by physical and mental, causes. In the article referred to, I have stated the connection often existing between congestions, general and local plethora, local determinations, and inflammations. Congestions and local plethora are frequently dependent upon the state of the venous circulation; and this upon obstructions in the liver, lungs, or heart; the efforts made to propel the blood in the capillaries, particularly under the influence of stimuli, readily inducing inflammation, especially of an asthenic kind. These states of vascular fulness, thus originating and predominating in the veins, are most common in persons advanced in life. On the other hand, local determinations of blood proceed chiefly from capillary expansion and arterial action, without venous obstruction; are most commonly observed in the young and those in the prime of life; and most frequently pass into the sthenic forms of inflammation.

98. But there are other states of the vascular system, upon which as much, probably, depends, not only in disposing to, but also in exciting, morbid vascular action, as upon vascular fulness; and to which very inadequate attention has been paid. These are the accumulation of effete and hurtful materials or elements in the blood, owing to imperfect depurating function. When the excreting functions of the kidneys, of the skin, of the liver, and even of the large bowels, are inadequately performed, the excess of hurtful, highly animalised, and irritating substances in the blood, as urea, &c., both predisposes to, and excites, inflammation in parts most susceptible of this cause of irritation, from previous disorder, or peculiarity of structure, or function. Irritating matters also may be carried from the digestive organs, or other parts, into the blood, where they may act in a way similar to those just mentioned. Thus inordinately exciting articles of food or drink, accumulated excrementitious matters in the biliary organs and intestinal canal, and morbid secretions pent up in any part of the body, are often absorbed into the circulation, and produce inflammations, varying in character with the kind of morbid matter producing it. (See art. Absorption.)

99. *g.* The *influence of the digestive organs* in the production of inflammations has been acknowledged, since it was insisted upon by John Hunter. But it is very probable, that the disorder of these organs, thus predisposing to inflammations, and the predisposition itself, are associated effects of deranged organic nervous influence. There can be no doubt, however, that when the functions of the stomach and bowels are disordered or impaired, and when the liver is torpid, and accumulations of bile are formed in the biliary ducts or gall-bladder, a predisposition to inflammations is not only thus induced, but also a greater tendency to asthenic action is thereby generated. The state of the digestive organs often indicates the degree of organic nervous power attending upon the disease; whatever deranges their functions, or aggravates existing disorder in them, increasing the general and local affection, and changing sthenic to asthenic action. The disorder induced in the organs of digestion generally extends to the organs of excretion, not only by the direct sympathy arising from nervous endowment, and from the dependence of both classes of organs upon the same nervous influence, but also by the changes produced by the former in the circulating fluids, — the predisposition to morbid vascular action being accordingly heightened.

100. *h. Mental emotions* also favour the occurrence of inflammation, when excessive. Violent fits of passion may even excite the disease, particularly in the brain, liver, or heart. The depressing passions, when extreme or of long continuance, induce the more chronic or asthenic states of morbid action, or cause the sthenic disease to assume either of these forms. The exhaustion consequent upon protracted or excessive nervous sensibility, and upon pain, has a similar effect. When pain is very violent, it seems to act like to concussion of the nervous masses or of the body, and to severe crushing injuries or wounds: — they all depress organic nervous power, and, when inflammation takes place, give rise to an asthenic or spreading form of the disease.

101. *i.* A predisposition to inflammations is often inherent in the frame from *hereditary conformation* or temperament (§ 93.), and from *previously disordered states* of certain organs or tissues. Parts which have been formerly inflamed are most prone to experience a recurrence of the disease. Organs which are liable to simple excitation, or to actively increased function, are generally much disposed to the different grades of sthenic inflammatory action; whilst those which are torpid, debilitated, or exhausted, are most prone to the asthenic states. Persons whose mental faculties have been inordinately exercised, are most disposed to inflammations of the brain and their consequences; and

those who have over-excited or exhausted the digestive organs, by too much or too rich food, and by intoxicating liquors, are most liable to inflammatory affections of the stomach, liver, and bowels.

102. *k.* The influence of *temperature, season, and climate* is shown, not only by their favouring the appearance, but also by their modifying the characters and forms, of inflammations. High ranges of atmospheric heat produce inflammations of the liver, stomach, and brain; and, if heat be conjoined with humidity, these diseases assume a low or asthenic form, the bowels being frequently also affected. Prolonged high temperature, especially when aided by humidity, changes the state of blood, affects the biliary functions, and imparts a peculiar character to inflammatory diseases. Thus in autumn, after hot summers, these maladies are frequently associated with marked gastric or bilious disorder; and in winter and spring, when the air is cold and humid, they often present an erysipelatous or catarrhal form. A cold and dry state of the air is generally wholesome, if due exercise be taken; and, without favouring the occurrence of inflammations, imparts to them an acute and sthenic character, the respiratory organs being the most liable to be affected. But there are other conditions of the air, or prevailing atmospheric constitutions, which dispose to inflammations, and bestow upon them, for a certain period, peculiar forms or features. The sources of these have not been ascertained, although they may probably be referred to electrical states and terrestrial emanations. However these prevailing constitutions may arise, there can be no doubt of their influence on inflammations, and of the necessity of ascertaining their nature and effects, as being requisite to an appropriate and successful method of cure.

103. From what has just been advanced, the influence of *climate* on inflammatory diseases may be partly inferred; for as the climate partakes the most of either of the foregoing characters, so will these diseases be prevalent or be modified. In cold, variable, and humid climates, inflammations of the respiratory organs, and the rheumatic and scrofulous diathesis, are most common. In warm humid countries, inflammatory action appears chiefly in the liver, digestive canal, and spleen; and especially when exhalations from the soil also come into operation, it either assumes, or rapidly passes into, asthenic forms.

104. It should be kept in recollection that several of these *causes of predisposition* sometimes act conjointly; that they may be sufficient of themselves to occasion inflammation, although they generally require the more efficient or determining action of the *exciting causes* next to be considered; and that as most of them either continue in operation during the disease, or are inherent in the constitution, *they exert a very marked effect upon the form, progress, and consequences of the disease.* Hence the necessity of ascertaining them fully, and of appreciating them correctly, in order to treat with success the disease they are concerned in causing.

105. ii. The Exciting Causes are very numerous and diversified, but uncertain in their operation, or ascertained with great difficulty. — Many of the predisposing causes, owing to their more intense or combined action, sometimes of themselves produce inflammation; and in such cases, the effect does not always appear in very obvious connection with its real cause. In many instances of visceral inflammation, the exciting cause is very obscure, the disease proceeding rather from a combination of circumstances, — some of them of fortuitous occurrence, — than from any one very obvious agency. The more direct causes may be considered with reference to their *mode of action* in producing the morbid effect: — 1st, Certain of them act by injuring the organisation; — 2dly, Some excite the organic nervous sensibility of the part, and, consecutively, vascular action in it; — 3dly, Others operate by affecting the function and circulation of the organ; inflammation resulting from those alterations in connection with predisposition; — 4thly, Many produce a specific or truly morbid action in the part, changing the organic nervous sensibility, the vascular action, and all the vital conditions, both locally and generally; — 5thly, Morbid matters secreted by an organ, or carried into the blood from a diseased part, may occasion inflammation by their direct effect upon the capillary vessels, as well as in one or other of the above modes; inflammation of one part thus giving rise, by means of some one of its consequences, to inflammation of another; and the morbid secretions from one organ inflaming others, with which they come in contact.

106. *A. The causes which act by injuring the organisation* are chiefly all external injuries, which divide, lacerate, or bruise a part. — Structures cleanly divided by a very sharp instrument are much less disposed to inflame, than those which are lacerated, bruised, or punctured. — *Lacerated parts* undergo much greater injury of organisation than simple division; their nervous fibriles and vessels are torn, and both these constituents of structure are thereby severely affected, the vitality of the part being often either directly or consecutively destroyed, and sloughing frequently taking place. — Violent *contusions* sometimes so disorganise a part as to prevent it from recovering any share of vital action. It then soon dies, and is cast off, or the system sinks under the shock primarily experienced, and the depression consecutively caused by the extent of local mischief, without inflammation having been fully developed. When contusions are slight, they recover without inflammation taking place; but when the capillaries are injured, or when their contents have partially escaped into the tissues of the part, or even when their tone is so much exhausted as to admit of much effusion, and especially when the cohesion of the textures has been more or less altered or overcome, inflammatory action is very liable to occur, although it does not necessarily take place. — *Punctured wounds* readily induce inflammation, and generally in proportion to the bluntness of the instrument. A triangular or round instrument also produces it more readily than a flat and sharp one. The disposition to inflammation from punctured wounds chiefly depends upon their extent, upon the nature of the structures which are implicated by them, upon the quantity of blood effused in the parts which they have penetrated, and upon the state of the constitution. Punctures of tendons, nerves, capsules, and aponeuroses, are much more injurious than of other parts; and the constitutional affection, in relation to the local injury and resulting inflammation, is very much greater. When much

blood is effused without a sufficient outlet, the punctured part being distended by it, and when blood is effused at the bottom of the wound, or in surrounding tissues, inflammation readily takes place; this fluid usually exciting inflammation in parts to which it is naturally foreign. The effects frequently also depend upon the nature of the body by which the puncture has been made. The teeth, claws, spurs, and spines of animals and fishes, generally produce very severe and even dangerous injuries, the punctures inflaming readily and rapidly, although no poisonous fluid has been inserted in them.

107. *Concussions* or severe shocks are often followed by inflammation. The parts which suffer from this cause are chiefly the brain, the spinal chord, the liver, and spleen. It is not only organic nervous power that is dissipated or exhausted in such cases, but the organisation is often more or less changed — minute lacerations of structure, or of capillary vessels, and consequent effusions or ecchymoses, being often found. The suspension of the functions caused by concussion is remarkably prone to pass into inflammatory reaction, when this species of injury does not altogether extinguish them. — Severe or prolonged *pressure* of parts often causes an asthenic inflammation of them, quickly passing into ulceration or gangrene. The *removal* of a gradually increased or continued pressure is often followed by a local and general inflammatory reaction, which in some cases, and as respects certain structures, becomes very acute, as in the peritonitis consequent upon parturition, and upon tapping dropsies of the abdomen. — *Ligatures*, or other causes of constriction, act by impeding the venous circulation; and various *positions* have a similar effect. They also aggravate inflammation when otherwise produced.

108. Various substances affect the organisation of a part, so as to induce inflammation, especially *mineral substances*. When these are applied in concentrated states, they destroy the organisation, inflammation appearing around the injured part. The pure alkalies, the strong acids, and certain of their salts, have this effect. But in weaker states, they inflame the tissues in the mode next to be considered (§ 109.). The bichloride of mercury, arsenious acid, &c., in an undiluted state, decompose or destroy the vital cohesion of the part; but in a weaker state they affect the organic sensibility and vascular action, thereby causing inflammation, and certain of its consequences. — *Extremes of temperature* affect the organisation almost directly, although in less grades; they act chiefly in the manner just mentioned.

109. *B. The causes which excite the organic nervous sensibility and the vascular action of the part*, are all those substances which are classed as stimulants or irritants. They act directly, and chiefly, on the parts to which they are applied. Inflammations of the skin, intestinal canal, urinary organs, and even of the respiratory passages, generally proceed from these sources. Prolonged friction, flagellation, the application of any of the above substances to the skin, or the ingestion of them into the stomach, and high ranges of temperature, produce inflammation in this way. Volatile or diffusible stimulants, irritating gases, and fine particles of mineral or vegetable substances, floating in the air, often inflame the respiratory passages. The atmospheric air, especially the oxygen of it, frequently inflames parts whose organisation is not suited to exposure to it. When the serous membranes of shut cavities are exposed to the *air*, they first become dry; afterwards more vascular than natural; and ultimately covered with a thin exudation of lymph, varying in thickness, and in the proportions of serum and coagulable albumen, with the intensity of vascular action, the constitution of the patient, and the powers of life. Mucous surfaces deprived of their epithelium, the skin without its cuticle, and other exposed or divided textures, are similarly affected; inflammation frequently supervening, unless when the lymph thrown out coagulates over them, and completely protects them from the air; and then the process of restoration usually takes place underneath the protection thus formed. Stimulating substances may be taken into the stomach, and pass from it into the circulation, without materially affecting the digestive organs, and yet they may inflame the organs by which they are excreted. Thus, cantharides and turpentine cause acute nephritis; and spirituous liquors, and the prolonged exhibition of iodine, excite chronic inflammation and organic lesion of the kidneys, giving rise to dropsy. Low ranges of temperature also sometimes occasion inflammation — not, however, by directly exciting the nervous influence and vascular action, but by remarkably depressing both, in the first instance; the consequent reaction proceeding to an excessive, severe, or prolonged state of inflammation. (See arts. Cold, and Gangrene.)

110. *C. The causes which affect the functions and circulation of an organ, aided by predisposition*, are numerous, and, like the preceding class, hardly admit of enumeration. Whatever inordinately excites the natural actions, and thereby the circulation of an organ, or whatever primarily stimulates the vascular action of a part, will frequently occasion inflammation of it; for the increased function or circulation will run on to inflammatory action, whenever a strong predisposition is present in the organ or constitution. The energetic actions of the brain are attended by augmented circulation, which may pass into inflammation. Increased function of the liver is often followed by inflammation of it. Excessive indulgence of the appetite and excitement of the stomach often precede some of the forms of gastritis or enteritis. In these cases, the natural actions are first inordinately excited, and morbid vascular action is thereby induced. But, in other instances, the order of morbid procession is reversed: the causes increase the circulation in the organ before the function is materially deranged. Thus *cold*, instead of benumbing sensibility, and of giving rise to a morbid vascular reaction upon its removal, in external or other parts on which it acts, often determines the momentum of the circulation upon internal viscera and surfaces; and if these be not partially relieved from the load or congestion thereby occasioned, by a free exercise of their functions, inflammation is a frequent consequence. Interruption of the exhalation from the skin, constriction of the surface, and diminished circulation both there and in the extremities, combine to drive the blood upon the mucous surfaces, and parenchymatous viscera; increased function, augmented secretion, or morbid vascular action resulting therefrom, according to the states of constitutional power or of predis-

position, and to the continuance or intensity of the cause. When cold is not protracted or intense, relatively to the constitutional energy and predisposition of the individual, the internal functions, especially those of digestion, and of excretion, the urinary particularly, are increased, and inflammatory action does not take place; but when the internal determination is not relieved by augmented secretion, nor removed by a restoration of the circulation to the surface and extremities, inflammation of the predisposed organ is often the consequence. Sudden, continued, or frequent exposures to cold, vicissitudes of temperature, and partial exposure to currents of cold air, to humidity, &c., are the most common causes of internal inflammation, and especially of the respiratory organs. As respects these organs particularly, it is not the sedative influence of cold, acting upon exhaling surfaces, the seat of active organic functions, but the reaction consequent upon the removal of this influence, that occasions the inflammation; the primary influence of cold only disposing the part to inflame, when reaction takes place, or modifying the reaction, so as to cause it to run on to inflammation. Hence it is that persons, after going into a cold air from a warm apartment, generally escape inflammation of the air-passages, unless they be perspiring, or the predisposition to inflammation be strong, when they avoid a sudden return to a high temperature, by which reaction is liable to be morbidly increased; and hence the greater danger from exposure to much warmth after the prolonged or intense influence of cold, than from the cold without the subsequent injurious action of heat.

111. *D. The specific causes of inflammation*, whereby the organic nervous sensibility, the vascular action, and all the vital conditions are truly morbidly altered, both locally and generally, comprise all infectious, contagious, and contaminating matters, particularly when applied to an abraded surface or wound. Most of the substances forming the second and third classes of *infectious agents* (see art. Infection, § 4.), and arranged also under the head of Animal Poisons (see that article), produce inflammation, presenting one or other of the local and general forms described under the asthenic species (§ 54. *et seq.*). The secretions and fluids of one person may excite inflammation when applied, as just stated, to another; but the effect is more certainly produced when these matters are taken from the dead body, and especially when they are the product of inflammatory or other disease. The serous, puriform, sanious, or sero-puriform fluids generated by specific or constitutional maladies, and by diffused inflammations of the peritoneum, or even of other serous surfaces, possess the property of exciting the asthenic or diffusive forms of inflammatory action in a very remarkable manner. The most dangerous effects generally follow the inoculation of these fluids from the recently dead, or from the still warm body, or even the application of them to the skin. The next most noxious effects result from the introduction of animal matter in a very far advanced stage of putrefaction. In both cases, but in the former especially, the constitutional affection is most severe (§ 59.). Even when the local injury is hardly to be perceived, as well as when it is more manifest—vesicles or pustules arising in its vicinity—inflammation extends through the cellular tissue in the course chiefly of the lymphatics or veins, sometimes implicating these vessels, and abcesses form under the muscles, particularly under the pectoral and other muscles of the chest; a great part of the cellular tissue on the trunk, and even the serous surfaces underneath, becoming implicated in the disease. Occasionally the inflammation presents the characters of some one of the varieties of *erysipelas;* the particular form of the local, as well of the general affection, depending upon the constitution and previous health of the patient, and upon the nature or properties of the animal poison. The most virulent of the morbid poisons seems to be the fluid effused in the large cavities, and particularly that found after puerperal peritonitis, in recently dead bodies. The recent brain, the substance of fungoid, carcinomatous, and medullary tumours, and the sanious fluids proceeding from diffusive, erysipelatous, and gangrenous inflammations, are also frequently productive of most noxious effects.

95. Although the most dangerous form of inflammation is caused by the fluids of the recent human subject, yet those of recently killed *animals* produce no such effect. This probably arises from death being caused in the former by disease, in the latter by bleeding, during a state of health. When, however, the fluids of animals which are either diseased or under the influence of inordinate excitement, or of its more immediate effects, are applied to a wound or denuded surface, the effects are often severe, although not so dangerous as in the former cases. (See arts. Infection, and Poisons — *Animal.*)

112. iii. Consecutive Inflammations.—*Morbid matters secreted by an organ, or circulating in the blood, frequently produce inflammation of either neighbouring or distant organs.* — This is an important class of causes, and, like that immediately preceding, generally occasions the asthenic or diffusive forms of inflammation. When the natural secretions of an organ are rendered unusually morbid or irritating, either from perverted action, or from the accumulation of noxious elements in the blood, the canals through which they pass are often irritated and inflamed by them. The morbid bile formed during affections of the liver, or in the course of gastric, bilious, remittent, and continued fevers, often occasion the enteric or dysenteric complications occurring in these diseases. Inflammations of the colon and rectum also often arise from this cause, as well as those of the gall-bladder and bile-ducts. The secretions on the surface of the skin, especially when allowed to accumulate and remain on it, are the most frequent causes of cutaneous inflammation; and alterations of the urine often occasion inflammation of the urinary bladder. Indeed, most of the complications appearing in the course of febrile diseases, arise either from the morbid state of the secreted fluids, or from that of the blood itself; the organic influence being remarkably susceptible of their impressions, and the vascular system being readily excited by them to an increased action, devoid of power or healthy tone. When vital power or organic nervous influence is extremely depressed, as in adynamic, typhoid or exanthematous fevers, the parts with which diseased secretions come in contact are unable to resist the impression made by them, or to throw them off by means of a healthy secretion from their own surfaces, and by sthenic muscular action. Hence, this impression is soon followed by asthenic inflammation.

113. Morbid matters may also be *absorbed* from mucous surfaces, from hollow organs, or from the more solid structures in which they have been formed, and be carried by the lymphatics to glands, and even into the veins and general current of the circulation; and they may, moreover, be formed on the internal surfaces of the vessels themselves, contaminating the blood in either case, or altering it in such a manner as to excite inflammation in various different and distant organs. Sanious or morbid fluids may be taken up from the cavity of the uterus; and, passing into the veins and blood, occasion phlebitis or other forms of malignant puerperal disease. Morbid secretions in the intestinal canal may be absorbed and carried into the blood of the vena porta, and excite diffused or other forms of hepatitis; these results taking place the more readily, the more unhealthy the secretions are that are accumulated in these situations, and the more depressed the vital powers.

114. iv. SECONDARY INFLAMMATIONS.—Morbid matters, also, from *primary* inflammations, may excite *secondary* inflammations, — 1st, In the course of connecting cellular tissues or membranous surfaces; — 2dly, In lymphatics and absorbent glands; — 3dly, In veins; — 4thly, In parenchymatous viscera; — 5thly, In synovial capsules, &c.; — and, 6thly, In serous or mucous surfaces. The secondary disease, in either of these situations, is most frequent when the morbid matters from the primary inflammation are effused in the substance of a part without being confined or limited by a barrier or cyst formed by coagulable lymph, and when organic or nervous power is much depressed. — *a*. The *mode* in which the consecutive or secondary disease is developed, is different in most of these situations, and is perhaps doubtful as respects some of them. When the primary inflammation of *membranous surfaces* or of *cellular or adipose tissues* is asthenic, it is not only disposed to extend in every direction without any break or interval, but it often advances to distant or even remote parts, without the intervals presenting any manifest change, and after various intervals of time. Several states of erysipelas and diffused inflammation of the cellular tissue, and of mucous and of serous membranes, illustrate this. When the extension of the disease is continuous, the nature of the tissue, and the infiltration of the fluids from the primary inflamed part, are the chief causes of it, in connection with weak powers of resistance; but when a part opposite to, or adjoining, an inflamed surface also becomes inflamed, without the intervals between both being affected, the cause will generally be found to have been the fluids effused from the part first inflamed, which have acted as excitants or irritants of the healthy parts with which they have come in contact. Inflammations of serous, cutaneous, and mucous tissues frequently illustrate this fact. When distant parts are secondarily affected without admitting of this explanation, we can only infer that, as long as constitutional disease exists, so long will it continue to manifest itself locally or externally, or in some part or other of the same tissue which it is most disposed to affect, or in some other predisposed part.

115. *b*. In several asthenic, specific, and chronic states of inflammation, the morbid matter absorbed from the primary seat of disease inflames chiefly either the *absorbents* or the *glands*, or both the *lymphatics and glands*; the former often in their whole course, from the primary lesion till the glands are reached, the latter principally in the groins, arm-pits, and neck.—In either case, the connecting and surrounding cellular tissue is also inflamed, small abscesses are formed, or a diffused infiltration of a sero-puriform, sanious, or ichorous matter takes place in their vicinity, especially around the glands; and the disease is thus complicated and prolonged. The constitutional powers in these cases, are affected more and more seriously, owing to the effect produced either upon the organic nervous influence, or upon the vascular system and blood itself, or to these causes combined; but the local, and especially the general, disease presents characters having more or less reference to the primary or exciting cause, from which indeed it derives its specific characters, as when inflammations are caused by a specific animal poison.

116. *c*. The *veins* are often the seat of the consecutive inflammation, especially after the primary asthenic forms of the disease, or when the powers of life are depressed, — when the fluid products of inflammation are effused upon wounded or divided surfaces, or are insufficiently confined by the effusion of coagulable lymph, or by cysts, — and when morbid secretions remain long in contact with absorbing surfaces, or in situations where venous imbibition may take place, as in the cavity of the uterus after delivery, and on divided surfaces after amputations and other surgical operations. In these cases, the consecutive phlebitis assumes various characters, according to the constitutional powers of the patient. If the vital powers be not materially reduced, coagulable lymph is thrown out upon the internal membrane of the veins, and the blood is thereby coagulated in them. The circulation through them is thus arrested, and the products of inflammation are prevented from mixing with the mass of blood. In such cases, the inflammation sometimes extends to the more external coats of the vein, and small abscesses form externally to them, and press upon and obliterate their canals; the obstruction to the circulation in them thus occasioned, further preventing contamination of the fluids. In other cases, purulent matter is secreted within the vein, and is partially confined either by coagula or by albuminous exudations on the internal surface of the vessel, or by both; and, in some instances, even when these have been formed, the puriform matter has evidently mixed with the blood without coagulating it. When pus has been found in the centre of coagula, it is extremely probable, that it has caused the coagulation of the fibrinous portion of the blood in the partially obstructed vessel, and has thus become inclosed in the coagula. When the powers of life are extremely depressed, the secondary phlebitis is not limited by an effusion within the vessels of coagulable lymph, with or without pure pus, and by an extension of the inflammatory action to the external coats and connecting cellular tissue, as in the above states of the disease, but is rapidly extended along the internal surface of the veins; the morbid secretion from the surface not consisting of coagulable or healthy lymph, or even of pus, but of a sero-puriform or of a sanious or ichorous fluid, which is not capable of coagulating the blood in the inflamed veins, but which readily

mixes with it, and contaminates it, thereby producing all the phenomena of adynamic or malignant fever. (See art. Veins — *Inflammation of.*)

117. *d.* Inflammations of *parenchymatous or other viscera* are often *secondary or consecutive* upon primary inflammation of remote or external parts. The brain, the lungs, liver, and kidneys are most frequently thus remotely affected. In these cases, there may be extensive inflammatory appearances without purulent collections; but most frequently one or more purulent collections, or distinct abscesses, or merely puriform infiltrations of the inflamed parts, are observed. In some instances, the puriform collections and infiltrations are attended either by very few marks of inflammatory action, or by almost none, so as to render it even doubtful, whether they have resulted from inflammation, or from a simple deposition, or separation, from the capillaries of the secondarily diseased part, of the morbid fluids absorbed into and circulating with the blood. I believe, however, that, in these cases, the morbid matter in the blood excites a sufficient degree of inflammatory irritation of the capillaries of this part, to form the diseased secretion infiltrating it; and that, as in other instances where inflammation has unequivocally existed during life, the principal indications of it, in the affected tissues, have vanished soon after death.

118. When secondary inflammation seizes upon a parenchymatous organ, remote from that primarily affected, it will generally be found that it is owing to the passage of the morbid fluids from the primary seat of inflammation into the blood, these fluids consecutively inflaming the parts most predisposed. In some cases the secondary disease has been preceded by, and is associated with, phlebitis; in others, this complication cannot be detected. Even in cases of primary, as well as of consecutive phlebitis, secondary inflammations of internal viscera, with purulent collections or infiltrations, are very frequent. But this subject is fully discussed in the articles Abscess, and Veins.

119. *e.* Consecutive inflammations of *synovial capsules,* and in *serous surfaces,* are observed chiefly in similar cases and circumstances to those just described (§ 115. 118.), — when the blood contains morbid secretions, or when the veins are inflamed and the powers of life much reduced. The former of these structures are often affected by the contamination of the fluids consequent upon syphilis, and upon the subsidence of confluent small-pox; the latter in the advanced stages of diffusive inflammation of the cellular tissue, or of phlebitis, or of inflammation of the lymphatics, particularly when either disease extends to the trunk. It also is sometimes consequent upon extensive burns or scalds, especially when the surfaces over the large cavities are primarily inflamed by these accidents.

120. *f. Mucous surfaces* are secondarily inflamed, both by the passage of the fluid products of primary inflammation over them, as when laryngitis or bronchitis supervenes upon an ulcerated cavity in the lungs, and by the absorption of these products into the blood. These surfaces, especially those of the large bowels, perform an excreting, as well as a secreting function, and the morbid matters, in the course of their elimination from the circulation, excite inflammatory action, generally of an asthenic form, not only in these surfaces, but also in other organs performing similar offices, as the kidneys, liver, &c. Thus secondary inflammation and ulceration of the large bowels, kidneys, &c., often occur in the course of tubercular excavation and ulceration of the lungs, and of abcesses in the liver.

121. VI. Prognosis.—The prognosis of inflammation can be stated only in general terms. The more special circumstances connected with this subject must necessarily be considered in the articles devoted to the inflammations of particular organs and textures; for the result will mainly depend upon the organ affected, as well as upon the form, severity, and stage of the disease, and upon the consequences which may have already taken place.

122. *A. As to the organ or structure affected*, it is unnecessary to state more than that the danger of inflammations is great in proportion to the vital importance of the affected part. Acute inflammations of the stomach, of the intestines, of the lungs, of the heart, of the brain, of the liver, and of the kidneys, are all attended by more or less risk, owing to the disturbance of function attending them, to the shock which the whole frame experiences from the attack, and to the consequences and changes of structure, or the disorganisation, which they often occasion. Yet the danger is still greater when the *blood-vessels*, whether arteries or veins, are inflamed; for the products of the morbid action are then liable to mix with, and to contaminate, the blood, and thereby to infect, in a very dangerous manner, the whole frame. — Inflammations of *serous membranes*, particularly at advanced stages, and in unhealthy subjects, are always attended by great risk of life; for the fluids effused by the disease either accumulate to a fatal extent in the shut cavities they form, if effusion be not early prevented or restrained, or agglutinate their opposing surfaces, so as to impede the functions of parts and to occasion dangerous consecutive disease. Much, also, of the risk attending inflammation of parenchymatous organs proceeds from the extension of the disease to their serous surfaces, and from the effusion consequent thereon. — Inflammations of *mucous surfaces* are much less dangerous than those already mentioned; and chiefly because the secretions which they produce favour a resolution of the morbid action, and are thrown off the diseased surface, — a source of irritation being thus removed. They often, however, occasion great risk to life, by the extent of surface affected, and by the disturbance of the functions performed by it, as in cases of universal bronchitis, where the changes produced by the air on the blood are impeded both by the disease, and by the morbid secretion produced by it. Inflammation may also extend from these surfaces to adjoining structures; the substance of vital organs, and even their serous envelopes, becoming extensively implicated, and the danger proportionately increased. — The *consecutive,* and particularly the *secondary, inflammations* described above (§ 112. 114.) are always most dangerous.

123. *B. The form and severity of the inflammation* necessarily influence the prognosis. — In general the *asthenic forms* are much more dangerous, other circumstances being the same, than the *sthenic.* Yet a very acute sthenic state of the disease, especially of internal viscera, may be as

rapidly fatal as any other, — the intensity of the morbid action soon exhausting vital power, and superinducing the more unfavourable consequences and terminations already described, especially copious effusion, suppuration, gangrene, &c. — The asthenic states of inflammation, even in external and non-vital parts, are seldom devoid of danger, unless they are early subjected to a most judicious treatment; for they generally originate in unfavourable circumstances: either the constitution of the patient is impaired, and the assimilating and excreting functions are weakened; or the causes which produced them are poisonous, contaminating, or infectious. Their diffusive or spreading character, generally arising out of these circumstances, increases the risk, not merely from the extent of the diseased state that results, but also from the contamination of the circulating fluids that often takes place, and the consequent depression of the powers of life.

124. *C. The age, strength, previous health, diathesis*, and *habits of the patient*, are concerned, not only in favouring the production and the character of the inflammation, but also in modifying its course, consequences, and terminations.—Early age, strength of constitution, and previous good health, are generally favourable circumstances, in respect both of the form and result of the disease. Yet, in very robust and plethoric persons, accustomed to active exercise in the open air, and in the habit of drinking largely of malt or spirituous liquors, inflammation is apt to assume a most intense form, rapidly terminating in gangrene, effusion, or abscess. Inflammations of previously weakened or diseased organs, or of parts which have formerly been the seat of inflammation or congestion, and in the scrofulous, gouty, or rheumatic diathesis, are more or less unfavourable, particularly if affecting internal viscera; and, even in the mildest forms, are managed with great difficulty. — The habits and modes of life of the patient remarkably influence the prognosis. Persons who live temperately and abstemiously, and particularly those who partake of little animal food, and who abstain from stimulating beverages, are seldom subject to severe or dangerous inflammation On the other hand, persons who live grossly, who eat much animal food, and who drink much malt and spirituous liquors, experience the most severe and unfavourable forms of the disease, — especially if they are engaged in sedentary occupations, or take insufficient exercise.

125. *D.* It is obvious that inflammations are more unfavourable in *an advanced stage*, than when they come under treatment at an early period. But the degree of danger will depend chiefly upon the consequences to which they have already given rise, and to the seat and form of, and other circumstances connected with, the attack. The *extent* and exact *condition* of the local affection, and of the *effusion* which has taken place; the extent to which the functions of the affected organ are impeded; the commencement or presence of *suppuration*, or the imminent risk of *abscess;* the state, severity, and character of *the constitutional affection;* the degree of disorder manifested by the digestive, excreting, circulating, and nervous systems; and the state of the vital powers, — must all be taken into account, and an opinion formed conformably with the conditions they severally present: for, in proportion to the progress of the disease, and of any of its consequences, and to the amount of disorder manifested by the constitution generally, or by a vital organ in particular, will the risk of an unfavourable issue be great, especially if an internal viscus be the seat of inflammation. The degree in which the cause of the disease may operate during its continuance, should also influence an opinion as to the result; for it is obvious, that persistence of the causes will increase and prolong the effect, and render the consequences more unfavourable, than when the causes have been removed. (See arts. ABSCESS, ADHESIONS, GANGRENE, and the articles on diseases of the individual tissues.)

126. VII. THEORY OR NATURE OF INFLAMMATION. — The various states of inflammation cannot be satisfactorily considered without reference to the structure and vital relations of the arterial and capillary vessels; and, indeed, of the vascular system generally. — *A.* The *external* or *cellular coat* of arteries is more dense than common cellular tissue; and hence it rarely partakes of the serous infiltration of this tissue. It sometimes, however, is the seat of inflammatory exudations, particularly of coagulable lymph; and it occasionally contains a small quantity of pus, and more rarely of extravasated blood. It possesses the greatest degree of tenacity of any of the coats. — The *middle* or *fibrous* coat is highly elastic, particularly in the circular direction of the fibres, and consists of a substance in all respects resembling the elastic ligament of the spine. The fibres composing this tunic are connected by fine cellular tissue, but are easily separated by the pressure of a ligature. This coat is most developed in the large arterial trunks, and most subject to the impulse of the heart; it almost disappears in the smaller arteries, and entirely in the capillaries. The elastic power which it exerts, keeps up a continued pressure on the column of blood in the arteries; diminishing, however, with their size, until it nearly ceases in the capillaries. This elasticity accommodates the vessels to the quantity of blood passing through them, and facilitates the circulation by the pressure and reaction exerted on their contents. — The *internal* or *membranous coat* is highly polished on its internal surface; is transparent; and, although it resembles the finer serous membranes, it is more friable on pressure, and yet more elastic, than they.

127. In the finer arterial branches and capillary vessels, the fibrous or middle coat of the arteries disappears, so that these vessels seem to consist only of membranous canals, surrounded by cellular tissue. The muscularity and irritability of these vessels, although the subjects of so much discussion from the days of VACCA and HALLER, are mere figments, which now deserve not the least notice. The muscularity does not exist, and the irritability is merely simulated by the changes consequent upon the application of agents which affect the organic nervous influence, and vital contractility of the tissues and capillaries.

128. The *nerves* which supply the arteries and capillaries are chiefly ganglial, or derived from the organic or sympathetic system. But filaments from adjacent parts of the cerebro-spinal nervous system communicate with them. Ganglial nerves have been traced around the arteries as far as the interior of the cranium, and the principal arteries

of the extremities, by Weber and the author, in 1816 and 1817, and more recently by Ribes and others; and there can be no doubt that they extend even to the capillaries, endowing these vessels with influence, and with the properties evinced by them in health and disease.

129. The *vital states* which arteries and capillaries manifest, especially when influenced by stimulants, or depressants, are these: — 1st. Of turgescence, dilatation, or enlargement; — 2d. Of contraction or constriction; and, 3d. Of healthy or natural tone. — The first and second are anormal states, the third normal, and consistent with all the natural functions. It is to the *first* of these that attention is principally to be directed in discussing the nature of inflammation; but, before this state is considered, a very few remarks may be offered on the others particularised.

130. *a.* The *constriction* of arteries and capillaries arises chiefly from agents, which increase the vital contractility of tissues. Many of these agents are of very opposite natures, and yet they act, particularly in certain grades of activity, and periods of operation, in definite modes. Cold, fear, and other depressing passions, severe injuries, shocks to the system, &c., contract parts susceptible of organic contractility, especially the skin; arterial, capillary, and venous canals; cellular and serous tissues, &c. &c.: but, if the operation of these agents is intense, or long continued, the natural tone of the contractile tissues and vessels is impaired, and vital exhaustion or relaxation ensues. A similar constriction of these parts follows the application of astringents and refrigerants; the sudden diminution of the circulating fluids, as by hæmorrhage or venæsection; and the depression of vital power by whatever cause. The contraction of arteries and capillaries soon after death depends chiefly upon the weakened injection of blood into these vessels, just before dissolution, and to the entire cessation of the action of the left ventricle. The organic or vital contractility of arteries and capillaries is then no longer antagonised by the action of the ventricles upon the column of blood they contain, and is consequently allowed to advance to the utmost permitted by the fibrous and cellular coats; the arteries, and even the capillaries, being consequently found nearly empty and constricted after death. But as contractile parts lose their rigidity or tone with the incipient decomposition of the structures, the vessels afterwards relax, so as to allow a larger column of fluid to be injected through them than in the living state.

131. *b.* In the *healthy* or *natural tone* of contractile tissues, the arteries, capillaries, and even the veins, fully participate. Still this natural state of the vessels is liable to various deviations or deflexions, either to the side of turgescence, or to that of constriction, without amounting to what constitutes a truly morbid condition. Numerous causes produce either constriction or turgescence, without reaching the pitch truly injurious. It is chiefly when the action of the causes is intense or continued; or when they alter, by their primary and specific influence, the vital properties of the sentient system and contractile tissues; that the effect becomes truly morbid, and diseased action is set up. Much, however, depends, in such cases, upon constitutional disposition, or the degree and kind of susceptibility existing at the time of exposure to the causes. Agents which produce no derangement in some persons, violently affect others; and the same cause, which was without effect at one time, may be most injurious at another, — owing to varying states of organic nervous energy and susceptibility.

132. *c.* The *state of turgescence, dilatation,* or *enlargement* of the smaller arteries and capillaries, although a part of the inflammatory act, does not alone constitute it. Something more is necessary to its unequivocal production. This state may take place without being at all morbid, — as in the excitement of erectile parts, in the development of the uterus and mammæ during pregnancy, in the enlargement of collateral vessels after the obstruction of a large artery, in the act of blushing, and in the rapid growth or restoration of parts. It may even be morbid, or at least the source of disorder, without constituting inflammation. The active congestions and determinations of blood to particular organs, although often passing into inflammation, yet are very different from it. In these vascular disorders, more or less turgescence, or dilatation, of the smaller arteries and capillaries, as well as of the smaller veins, obviously exists; but still this state is not attended by the same phenomena, and does not give rise to the same consequences, as are observed in the various forms of inflammation. This state of turgescence of the capillaries of inflamed tissues has especially fixed the attention of modern pathologists; and the question, with them, has been almost limited to the inquiry, as to whether the increased diameter of the capillaries is to be imputed to relaxation or debility, or to augmented action. The least material point of the many, which should have fixed their attention, has thus alone engaged the whole of it; and, whilst they have attributed every thing to one or other of these two conditions, they have entirely overlooked the fact, that they are both contingent or consecutive changes; that either may exist according to the stage and form of the morbid action; and that the one as well as the other may be present quite independently of, and without, inflammatory action.

133. The *state of the capillary circulation* in inflammation has been agitated since the commencement of the present century, and even at the present day, with a parade of useless, deceptive, and ill-conducted inquiry, dignified with the name of experiment. Numerous cold-blooded and other reptiles, and often animals, very differently organised from the higher species, have been tortured for evidence, whereupon an argument might be hung in behalf of preconceived hypotheses; and crude and puerile observations have been made the basis of doctrines, which have failed of attracting notice, either from having been imperfectly understood, even by their propounders, or from having been overlaid by the multitude of words, in which attempts have been made to convey them. Thus the author of a recent work, entitled "A Critical and Experimental Essay on the Circulation of the Blood," &c., not only derives his inferences from imperfect observations, made at similar sources to the above, but also, because he observed an oscillating motion of the blood in the aorta of a frog after tying the vessel, jumps to the conclusion that, "it would appear almost certain that the arteries

possess a muscular contractile power;" although the previous inquiry, as to the existence of a muscular structure in the coats of these vessels, that some honest observers might, perhaps, have thought necessary, had never been entered upon by the author.

> "Such reasoning falls like an inverted cone,
> Wanting its proper base to stand upon."

134. Before entering upon a fuller explanation of my own views as to the theory of inflammation, and which are essentially the same as were published at first, more than twenty years ago, and at several times subsequently, the opinions of some writers most deserving notice may be adduced; although, as respects inflammation especially, a rational explanation of phenomena, as they are subject to our senses, is to be preferred to a mere collection of opinions — of hypotheses; in many of which, parts only of the truth appear — the rest being either kept entirely out of view, or hid under an accumulation of loose analogies and inconsequent argument, or buried in heaps of unmeaning verbiage.

135. i. Opinions as to the Nature of Inflammation. — *A.* Inflammation was very generally attributed to vitiated states of the fluids, until Van Helmont ascribed it to an irritation which attracted the blood in a greater quantity than natural into the capillary vessels, — the irritation arising from an affection of the *archæus* or vital principle. Willis, notwithstanding his espousal of the chemical doctrine of the blood, attributed more to the local irritation of Van Helmont, in the production of inflammation, than to the morbid condition of this fluid. Towards the close of the seventeenth century, several theories of inflammation, and of disease in general, were promulgated. The followers of Des Cartes imputed inflammatory action to a fermentation excited by the æthereal fluid which they supposed the blood to contain, and which Des Cartes substituted for the *gas** of Van Helmont. The opinions of Sylvius were merely modifications of those of the two pathologists just named, and an accommodation of them to the chemical doctrines of the day — acidity of the fluids performing an important part in his theory. Le Mort, Schneller, (*Theoriæ Mechanicæ Delineatio*, 8vo. Leyd. 1705.) and others, adopted the mechanical parts of the doctrines of Des Cartes, and associated them with certain chemical hypotheses not much more deserving of notice. They imputed inflammation to irritation caused by the æthereal particles of the fluids without any reference to other changes. The partial rays of light, furnished by the rising of chemical science in Europe, were soon employed to explain morbid actions; but they led, especially at first, to little more than to modifications of the doctrines previously adopted, and particularly of the humoral pathology, and never disclosed results deserving of lasting attention.†

136. Pitcairn, the master of Boerhaave, first opposed the chemical pathology then very generally received, and applied the mathematical doctrines promulgated in Italy by Borelli, Sanctorius, and Bellini, and still more widely disseminated by the classical work of Donzellini (*De Usu Mathemat. in Arte Medica: in Guilielmini Opera.* 4to. Genev. 1719. t. ii. p. 516.), to the pathology of inflammation. To those acquainted with the physiological and pathological views of Des Cartes, the mathematical doctrines of the Italian physicians will appear as a very obvious and easy application of mathematics to the mechanical parts of the pathology, of which this philosopher may be said to have been the founder. Although numerous modifications of the theory of inflammation were proposed by writers of the mathematical school, yet they may be generally referred to an *error loci*, or to the obstruction which they supposed to be occasioned by the passage of the larger sized globules of the blood into a smaller series of capillaries, intervening between the arteries and veins‡, than are destined to receive them.

137. Boerhaave proposed a theory, which, if it was not altogether original, was at least an important modification of that of Pitcairn, and of the mathematical school. He supposed that the blood itself became more viscid, causing a *lentor* in its circulation through the several orders of capillary vessels, and an excessive engorgement of them; an increased action of the larger vessels, and flow of blood in them, taking place to overcome the resistance and congestion. The close resemblance of this hypothesis to others much more recently proposed, is very obvious. That the action of the larger arteries should be increased, where an obstruction to the circulation through the capillaries exists, may readily be conceded; but that the afflux of blood can be increased, and obstruction at the same time exist, is a contradiction in terms. In one essential point connected with the theory of inflammation, Boerhaave differed altogether from Pitcairn. The former supposed that a constriction of the

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* Carbonic acid and hydrogenous gases were partially known to Van Helmont, and this imperfect knowledge of gaseous fluids became the basis of several of his pathological views.

† The Dutch physicians at the end of the seventeenth century were amongst the chief writers on Pathology, and consequently on Inflammation; and the schools of medicine in Holland were acquiring a reputation, which rose with the commercial prosperity of that country. But it is not altogether uninteresting to remark how many of the medical writers in it, about this time, adapted their pathological views, as well as their practical precepts, to the promotion of the traffic of the people. The foreign trade of Holland, rising upon the decay of that of Portugal, Spain, Venice, and Genoa, furnished numerous articles of luxury, not only to the Low Countries, but also to all Germany, and the East of Europe. Many of the medical writers of the country brought them into general use; and, whether they imputed inflammation and other diseases to inspissation, or to acidity, or to alcalinity, or even to effervesence, of the circulating fluids, still tea, tobacco, coffee, and opium, in extraordinary quantities, were not only the chief remedies, but also the principal prophylactics recommended by them.

‡ The mathematical school boasts of a numerous list of names eminent not only in medical, but also in mathematical, science and in art — of Guilielmini, Michelotti, Bernouilli, Baglivi, Perrault, Chirac, Quesnay, Hales, Mead, Sauvages, and others; and furnishes many splendid examples of the dignity, as well as of the aid, which general science has imparted to the study and practice of medicine. The mathematical doctrine of inflammation was founded on the belief, that the globules of the blood consisted of various sizes, and that the red globule was formed of six serous globules, and each serous, of six lymphatic globules; three orders of capillary vessels, suited to the conveyance of these globules existing between the arteries and veins. The obstruction caused by the passage of red globules into the wrong order of vessels constituted what they termed an *error loci*, and the cause of inflammation. — Whilst the Cartesians insisted much on the various forms of the globules and pores, the mathematicians contended chiefly for the different sizes of the globules and capillaries.

capillaries caused a congestion of blood and slower rate of circulation, whilst the latter considered that an increased diameter of the vessels had this effect. The great defects in the opinions of these physicians, independently of their incorrect views as to the conformation of the capillaries, and as to the constitution of the blood and blood-globules, were their entirely leaving out of consideration the power exerted by the organic nervous or vital influence upon the vessels, and upon the circulation through them; and their being unaware of the fact, that both constricted and enlarged capillaries, or other vessels, may have the circulation through them either accelerated or retarded, according to the state of that influence by which the capillaries, and tissues in which they ramify, are actuated.

138. Whilst the mathematical theory of inflammation and disease was evidently supported by, if it did not originate in, the philosophy of NEWTON, and was the first manifestation of the comparatively modern doctrines of solidism, the views of HOFFMANN were more referrible to the system of LEIBNITZ, and a more complete adoption of the influence of the soft solids in the production of morbid actions. According to this celebrated pathologist, inflammation proceeds from spasm of the smaller vessels, which suspends or impedes the circulation in one part, and determines it inordinately to others, red blood being thereby propelled into capillaries, which in other circumstances admit only the serous portion of it; pain, swelling, and heat resulting therefrom. This theory soon found supporters; and, notwithstanding the already promulgated doctrines of his contemporary and colleague STAHL, these soon became numerous. Whilst the doctrines of STAHL and HOFFMANN were dividing the schools of Germany, and especially that of Halle, where they were taught by these celebrated professors, the opinions of the mathematical pathologists and of BOERHAAVE were predominant in this country and in Scotland, until the lectures and writings of the elder MONRO, of WHYTT, and of CULLEN, attracted notice.

139. The medical doctrines advanced in Germany at the close of the seventeenth, and at the commencement of the eighteenth, centuries, had more or less reference to the most generally received metaphysical views. The relations already noticed between the doctrines of inflammation hitherto adopted, and the pathology of DES CARTES, existed chiefly in respect of their more mechanical parts. But the psychological opinions of DES CARTES, and of his successor MALEBRANCHE, were not made the basis of a system of pathology until STAHL adopted them as such at a very early period of life. PERRAULT* had previously demonstrated the influence of mind upon all the bodily functions; but STAHL had reference to this influence in the production, not merely of inflammation, but also of all diseases, notwithstanding the objections of GASSENDI, urged against the physiology of DES CARTES, that the direct influence of the mind was limited to the brain and the organs of sense and volition.

140. The doctrines of STAHL and HOFFMANN continued for many years to divide medical opinion, notwithstanding the efforts of KAAUW BOERHAAVE in behalf of the views of his more celebrated uncle, and his endeavours to connect them with the system of HOFFMANN. In this country the opinions of HOFFMANN, according to the explanation and modifications of them attempted by CULLEN, became most generally adopted, particularly with reference to inflammatory diseases, although the able writings of WHYTT strictly belonged to the school of STAHL. Of all the successors of BOERHAAVE, GORTER most strenuously insisted upon the fact, that inflammation does not consist of congestion of the diseased part, but of an irritation affecting the vital condition of the vessels, and the circulation in them. The influence of irritants upon the state of vital action was, however, first contended for by GLISSON; but to GORTER and GAUBIUS belongs the credit of having more fully illustrated it, and developed the laws of excitement, thereby furnishing a basis for the doctrines of BROWN and DARWIN at a much more recent period.

141. Whilst the doctrines of BOERHAAVE, STAHL, and HOFFMANN were dividing medical opinion, and at a time when the views of HOFFMANN were gaining the ascendancy in their more general adoption, HALLER first published his opinions on *irritability*. He afterwards developed them more fully, and referred this property to the organisation of the muscular fibre, but was opposed by WHYTT, LORRY, and GAUBIUS, as to its precise source; and, contrary to the opinion of the former, who referred irritability to cerebro-spinal nervous influence, he carefully distinguished it from, and endeavoured to prove its independence of, this influence. He disputed the doctrine of this pathologist, that exaltation of irritability determines the circulating fluids to inflamed parts; yet there is no doubt, as WHYTT observes, that the "heat, redness, and inflammation, brought on the skin by blisters and sinapisms, are not owing to any increase of the force of the heart, or of the *momentum* of the blood in the larger vessels, — though this is often an effect of their application,—but merely to the action of these irritating substances on the cutaneous vessels, whereby the motion of the fluids in them is greatly augmented." HALLER believed that the accumulation of blood in the capillaries was owing chiefly to constriction of the small veins, and that the derivation of this fluid to any particular part should be attributed to the removal of the resistance furnished by the state of the capillaries and veins. He agreed with WHYTT, that obstruction cannot of itself produce inflammation; and insisted upon extravasation of the red particles, as constituting a part of the redness observed in some inflamed tissues. WINTER, nearly at the same time as HALLER, published views as to irritability, similar to those of this celebrated pathologist; and VERSCHUIR greatly extended, and at the same time modified, the doctrines of the latter, especially as to irritability of the arteries and capillaries in warm and cold-blooded animals. The

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* PERRAULT commenced his magnificent career as a physician, and soon acquired by his writings the first eminence as a physiologist, naturalist, painter, sculptor, mechanist, and architect; in which last character he is best known, especially as the architect of the beautiful façade of the Louvre. He translated and illustrated VITRUVIUS with splendid drawings and engravings; wrote an extensive work, in two folio volumes, on the Natural History of Animals; published numerous Essays on Physiology and Physics; and at his death left for publication a collection of recently invented and useful machines. All his writings abound in originality; for, in his very diversified studies, he was guided chiefly by observation and his own genius.

chief sources of error in the observations of those eminent writers are their having viewed the fibrous coat of the arteries as muscular; their imputing the properties of muscular tissues, not only to these vessels, but also to the capillaries, which are unprovided with this coat; and their confounding not only organic or insensible contractility and vital expansion, but also the elasticity of fibrous tissues, with the irritability or sensible contractility of muscular fibres. The intimate structure of parts, and the kind and degree of vital manifestation proper to each, were imperfectly known to them, and indeed to many of their successors, and were insufficiently distinguished one from another; and hence were confounded in such a manner as to vitiate most of their pathological inferences.

142. The chief modification in the theory of Hoffmann, suggested by Cullen, was his belief in a *phlogistic diathesis*, predisposing to, and occasioned by, local inflammation, — this diathesis consisting in an increased contractility of the fibres of the whole arterial system. He objected to the opinion of Boerhaave, as to congestion of the vessels being a part of the inflammatory state; and contended that the obstruction is owing to spasm, which indirectly causes an increased afflux of blood to the affected part. "A spasm," he remarks, "of the extreme arteries, supporting an increased action in the course of them, may therefore be considered as the proximate cause of inflammation, at least in all cases not arising from direct stimuli applied; and even in this case, the stimuli may be supposed to produce a spasm of the extreme vessels."

143. Some pathologists, towards the close of the last century, and in still more recent times, being unable to reconcile the idea of increased action with the enlargement of the capillaries, and the swelling constituting inflammation, believing, as they did, that increased action must necessarily be productive of contraction, had recourse to the supposition that the disease depended upon *relaxation and diminished action of the extreme vessels;* others, again, ascribed inflammation to *increased action of these vessels;* and thus pathologists were divided into two opposing parties. The chief fallacies, common to both, were, their having taken it for granted that capillary and arterial vessels possess a muscular structure performing the function of muscular parts; and that an increased action, according to the one party, and a diminished action, according to the other, constitutes the principal, and indeed the only, morbid condition throughout the disease. These opposite doctrines have been so warmly discussed in recent times, each party endeavouring to support their own views by experiments, that it becomes necessary to consider them somewhat in detail.

144. *B.* The *doctrine of relaxation*, or diminished action of the capillaries in inflammation, the blood becoming nearly stagnant in the dilated vessels, originated with Vacca Berlinghieri (*De Inflam. Morbosæ Naturâ, Causis, Effectibus, &c.* Flor. 1765.), and was promulgated in this country by Mr. Allen, who modified the opinion of Vacca, and contended that the action of the arteries is increased, a larger quantity of blood being thereby propelled into the weakened capillaries than they can transmit. According to this theory, the exciting causes, even when they stimulate the part, produce not an increased action of the capillaries, but only excite the larger arteries supplying the inflamed structures, and ultimately quicken the contractions of the heart. The effect of this is, that a larger quantity of blood than usual is propelled into the weakened capillaries, and especially the colourless branches; and upon this unusual quantity the weakened vessels are unable to react, so as to carry on the circulation — stagnation and obstruction in them being the result. Dr. Wilson Philip modified the doctrine of Vacca in a different manner; and, whilst he maintained that the extreme vessels are primarily weakened, he contended that the action of the larger arteries supplying these vessels is consecutively increased; the differences between active and passive inflammations depending, according to him, upon the degree in which the arteries supplying the blood to the inflamed part are excited. In further illustration of his views, by experiments and microscopic observation, Dr. Philip remarks, that "the motion of the blood is retarded in the capillaries, in consequence of the debility induced in them: an unusual obstacle is thus opposed to its motion in the arteries preceding them in the course of the circulation, which are thus excited to increased action." In this statement of his views, one difficulty presents itself: — How comes the debility of the capillaries, causing retardation of the motion of the blood through them, to follow directly upon the application of stimuli? Dr. Philip infers the debility from the apparent retardation of the circulation of the red globules in his microscopic experiments; and, having inferred the debility, concludes that the apparent stagnation must really exist. Thus reasoning in a circle, he states the above doctrine as its result. The difficulty here adverted to, seems not to have escaped Dr. Hastings, who appeared in support of the opinions of Dr. W. Philip. The experiments of Dr. J. Thomson, stated in his excellent work on Inflammation, had demonstrated certain points subversive of the doctrine of Dr. Philip, and of these Dr. Hastings took some notice. Inferring, with his master, or, more correctly, with Vacca Berlinghieri, that "inflammation consists of a weakened action of the capillaries, by which the equilibrium between the larger and smaller vessels is destroyed, and the latter become distended," he, nevertheless, is compelled to admit, that increased action or temporary excitement of the capillaries may precede the debility constituting inflammation. "Certain stimuli," he remarks, "applied to living parts, produce an increased velocity of the blood's motion, and a contraction of the vessels. During this state of excitement, the part affected is so far from having any thing like the appearance of inflammation, that the size of the vessels is diminished, and the part paler. But if the stimulus be long continued or increased in power, the small vessels, which, in the natural state, admit only of one series of globules, become so dilated as to allow an accumulation of a much less fluid and redder blood in them, which loses its globular appearance, and moves much more slowly than that which previously passed through the vessels. The part now appears inflamed. If the stimulus be removed, the blood-vessels do not soon regain their original state; time is necessary to allow them to recover their contractile power, so as to prevent the impetus with which the blood is propelled by the heart and larger arteries from keep-

ing up the dilated state of the capillaries." Dr. Hastings further contends, that, when acrid substances produce inflammation, debility of the capillaries takes place without previous excitement, the blood becoming very red, circulating very slowly, and stagnating in some of the branches. As Mr. Morgan remarks, the hypothesis of weakened action of the capillaries, and slower motion of the blood in them, has been the most generally adopted of the recent theories of inflammation, because it admits of a more easy demonstration with the microscope.

145. All the supporters of this doctrine err, in attributing little or no share in the inflammatory act to direct excitement of the capillaries, — in believing that excitement must necessarily be attended by constriction of these vessels, and that dilatation of them is incompatible with increased vital action, — and in dismissing from their consideration the other morbid acts contributing to the production of the disease in its various stages and forms. That the extreme capillaries are weakened, dilated, and congested, and even that the blood stagnates in them at a more or less advanced period of sthenic inflammations, and at a very early period of the asthenic forms, have been stated above; but this condition is only one of several constituting the disease, which, in no instance and in no stage, depends upon a singleness of event, as contended for by the espousers of this and the opposite theory.

146. *C.* The *doctrine of increased action* of the vessels in an inflamed part may be attributed, as stated above (§ 140.), to Gorter and Gaubius, if not to Glisson. They considered that inflammation was the consequence of *irritation*, which increases the vital action of the vessels, and propels the coloured blood into the colourless capillaries. Mr. J. Hunter believed that inflammation is an increased action of the vessels of a part, attended by accelerated circulation; but he erred in supposing the vessels to be muscular, and the error vitiates more or less all his reasoning on the nature of the disease. Mr. Morgan states that Mr. Hunter's "opinion of the nature of inflammatory action is not clearly stated, nor does it appear from his writings that he had ever made any experiments in order to ascertain the state of the minute vessels." Mr. Hunter, however, has stated his opinion of the nature of inflammation in several places, even in the same chapter, and to the purport just given. At another place he observes, "the very first act of the vessels, where the stimulus which excites inflammation is applied, is, I believe, exactly similar to a blush. It is simply an increase or distension beyond their natural size;" — and again, "whatever purpose the increase of the size of the vessels may answer, we must suppose that it allows a greater quantity of blood to pass through the inflamed part than in the natural state, which supposition is supported by many other observations." Indeed, the whole of the section, on the "*Action of the Vessels in Inflammation*," contains a very detailed and distinct account of his views as to the nature of the disease. As to the assertion, that Mr. Hunter never made experiments to determine the nature of inflammation, the reader has only to refer to the section just mentioned, where he will find the details of observations and experiments made upon warm-blooded animals — not frogs, and other animals unsuited to the satisfactory elucidation of the subject — proving the justness of his views as respects certain states and stages of the disease.

147. The increased action of the capillaries in inflammation has been advocated by Dr. Parry, partly by Dr. J. Thomson, and by Mr. James. Yet most of the same fallacies which vitiate the doctrine of the opposite party, may be urged against the majority of those who contend for the truth of this, and especially their belief in the irritability of these vessels. Indeed, this phrase has been employed by many, without attaching any precise meaning to it, and without being aware that, if by *increased action* they meant *increased contraction*, or even an increased power of alternate relaxation and contraction, as in muscular tissues, the circulation of the inflamed part would be altered by it very differently from what is actually observed. The circulation in health through the capillary vessels does not require the aid of any action on their part; for the contractions and dilatations of the heart, and the elasticity of the larger arteries, are quite sufficient for the transmission of the blood, not only in the capillaries, but also in the veins. Agents which change the tonicity of the tissues will necessarily affect that of the extreme vessels, and, consequently, the state of circulation through them; but such agents will seldom give rise to inflammation, unless by a succession of changes, of which alteration of the state of circulation, — whether increased or diminished, — is only a part, as I shall endeavour to show hereafter.

148. The experiments which have been planned and performed with a view of establishing the truth of either of these doctrines of inflammation, have been altogether vitiated by the circumstance of the chemical action — 1st, upon the tissues, — 2dly, upon the capillaries, — and 3dly, upon the blood, of the agents employed in these experiments, having been entirely overlooked. But this is not all; the physiological or vital action of these agents has been neglected, equally with the chemical action, and even with the changes they produce upon dead animal matter.[1] These experiments abound, moreover, in other sources of fallacy, attributable to the means and aids used in ascertaining the effects, and to the subjects upon which they have been performed. Can it be believed that all these circumstances, — any one of which is sufficient to overturn the conclusions drawn from these experiments, — have been neglected? Instead of observing closely the changes taking place in tissues actually inflamed, and the succession of these changes in the different stages and forms of inflammation, as affecting different structures, substances producing both vital and chemical alterations in the tissues, blood-vessels, and blood itself, have been applied to parts, and the effects directly and remotely produced by them have been described as identical with inflammation, and made the basis of the prevailing doctrines of the disease. Before any inference, or even the smallest fraction of information, can be derived from the experiments paraded by many of the writers on this branch of pathology, it is necessary to bear in mind that acids, or alkalies, or alcohol, or turpentine, or neutral salts, when applied to a vascular tissue, produce effects which are not identical with any of the usual forms of inflammation. Acids affect the nervous influence of the part; constringe, corrugate, or cornufy the tissues and capil-

laries; change the colour and state of the blood in the extreme vessels, and arrest the circulation in them; and if inflammatory appearances supervene, much of the primary changes will still continue to modify its characters. Alkalies produce opposite effects; — they weaken the vital cohesion of the tissues, partially dissolve them and combine with them, redden and otherwise affect the blood, and, according to their strength, influence the form and termination of the morbid changes they produce in the part. Turpentine, and, in a less degree, alcohol, in their primary action, change the state of nervous power, constringe the capillaries and tissues, and retard the circulation in them; and neutral salts variously affect the vitality, the structure, the circulation, and the blood of a part, according to their individual constitution. When any one of the numerous substances which may produce inflammation is applied to a living tissue, the effects are not limited to the spot with which it is in actual contact. The impression extends, and a modified, or even opposite, action may be superinduced in surrounding parts. If the substance be injurious, or subversive of vital power in the part, more or less resistance is offered to the extension of the mischief. The injury affects the state of organic nervous power; and the irritation, or consequent reaction of this power, and its influence upon the surrounding vessels and blood, give rise to inflammatory action, either in the seat of injury or around it. If a living membranous tissue be pricked with a red-hot needle, the following effects will result; but these effects, although inflammatory in many respects, are not to be viewed as identical with idiopathic inflammation, as they have been by some writers, and for the reasons which will be stated. The red-hot needle will produce much pain, attended by the immediate constriction or corrugation of the tissues and capillaries; the blood being driven from the part immediately surrounding the puncture, the red globules undergoing a change in colour, and becoming stagnant in, and adhering to, the vessels adjoining the punctured spot. This is the immediate effect; but in a short time, — varying, however, with circumstances, — the punctured spot either becomes dark or black at a central point, around which the vessels dilate, the injury having either destroyed their continuity or obstructed them. The increased vascularity, which soon takes place around the injured spot, now becomes inflammatory, and is partly owing to obstruction in this spot, and to the consequent development of the surrounding capillaries, so as to carry on the circulation. But the affection, by the injury, of the organic nervous influence of the part, so influences the state of the extreme vessels, as to produce the chief of the phenomena. Now the early part of the changes here observed, are not to be viewed as identical with idiopathic inflammation, although illustrative of the production of inflammatory action by certain injuries; for the agent employed cornufies the capillaries, stagnates and changes the blood in them, obstructs their circulation, and severely affects the nervous influence; this last change especially producing, in the extreme vessels of the injured part, consecutive effects, which only are truly inflammatory, particularly in previously healthy constitutions or structures.

149. In order to arrive at any thing like a just notion of the nature of inflammation, the phenomena constituting it should be closely examined from the commencement, whether arising spontaneously, or produced by an irritant or excitant. But the phenomena observed in a single tissue, or in a particular form of the disease, are not to be viewed as constituting alone its characters in all stages, forms, and circumstances. The essential characters, as well as the subordinate phenomena, of inflammation, vary in all the states and stages of it; they are continually changing with their duration and the nature of the causes which produced them, and according to the temperament, habit of body, diathesis, and constitutional powers of the patient. So diversified do they thus become, that it would be endless, if not impossible, to describe them in all their conditions, periods, and consequences. The most prominent pathological states can only be mentioned; the descriptions already given, and the observation or experience of the reader, will supply deficiencies which must still remain, even after the most minute details.

150. ii. Pathology of Inflammation. — *A. Of the Nature of the Sthenic Forms.* — *a. The organic nervous tissue is primarily affected in the seat of inflammations of all kinds.* — I have already contended that inflammation, in its more *sthenic forms*, is a result of a *morbidly* excited state of the organic nervous tissue surrounding the extreme vessels or capillaries of the affected part, or a derangement from an unnaturally exalted condition of these nerves, on which the function of these vessels, and indeed of the whole vascular system, have been shown to depend. One of the chief inquiries concerning the nature[*] and pathological relations of inflammation is, whether this excited or exalted state of the organic nervous tissue is one of simple excitement or not, — whether the functions of the nervous tissue be merely increased above the healthy pitch, — or whether or not they are also otherwise changed. I have stated them to be morbidly or unnaturally excited, thereby indicating that they are increased differently from what we observe in a healthy part from the application of a stimulus, as respects both the *duration* and the *kind* of action they occasion.

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[*] The views which I now proceed to state, were published by me first, as already noticed, in 1815; on several occasions during the years 1821 and 1822, in the *Medical and Physical Journal*, and in the *London Medical Repository;* and still more fully in my *Appendix* to M. Richerand's *Elements of Physiology*, published in 1824. They were the result of a close investigation of the subject; and if the reader will refer to the section on *Inflammation*, which I added to the last of the works just mentioned, and afterwards to that of Kaltenbrunner, published in 1826, he will find my doctrine and observations fully confirmed by his researches, as well as by those of M. Gendrin, also published in 1826. A very large reprint of my *Appendix*, containing the same section on *Inflammation*, without any alteration or addition, appeared in 1829. In 1835, and at still later periods, treatises and essays on Inflammation have been published by several writers, in which the principal parts of my doctrine have been adopted, but without any reference to the original propounder of them. Of this I thought it not worth while to take any notice at the time, as I was about having it in my power to do myself full justice, and to an extent, in respect of circulation, infinitely beyond what could be reached by the works in question. It is very probable that the opinions first brought forward by me have been subsequently suggested to these writers, without having ever perused any of my writings on the subject; yet one of the works only, and that one containing a full exposition of my doctrine, has been circulated to the extent of several thousands.

151. The *duration* of the healthy exalted action consequent upon simple excitement, mental or physical, is generally brief — the effects soon subsiding with the removal of the cause — because the nervous influence exerted on the capillaries is simply increased, without the mode or habitude of this influence being changed in kind. When, however, an irritant, stimulus, or other cause, operates upon a part so as to change the mode of organic nervous influence endowing it and its capillaries, the consequent vascular excitement or action is not only of longer duration, but is also altered in kind: it becomes truly morbid; and it either subsides gradually before the conservative powers of this influence as exerted throughout the frame, or undergoes a succession of changes, until it terminates in one or other of the ways described as usually observed in sthenic inflammations.

152. That the first change occasioned by the exciting cause takes place in the organic nervous influence of the part, is proved by the early effect produced by it upon the organic sensibility, and on the functions more immediately dependent upon this influence. The uneasy sensation of inflammation, in its various states and modes, is to be ascribed (§ 8.) to the morbid impression made on the organic or ganglial nervous tissue, and is to be viewed as the sensible expression of the consequent change in the condition of the influence exerted by this tissue in the affected part, — as indicating a morbid state of this portion of the nervous system, producing, and attended by, deranged action of the capillaries in the affected organ, and often exciting, or otherwise disturbing, the sensibility and functions of the cerebro-spinal nerves, with the terminations of which the former becomes associated in many of the textures. The pain or uneasy sensation attending the changes in the organic nervous tissue, which affect the state of the capillary circulation, so as to give rise to inflammation, is, as shown above (§ 82.), very distinct from the morbid sensibility often manifested by the cerebro-spinal ramifications, as in the different forms of neuralgia, and of spasmodic affection; and, although the latter is much more acute and violent than the former, yet it never gives rise to much vascular disorder. Excitement of the cerebro-spinal nerves has but little immediate influence upon the capillary circulation, excepting that of the countenance, as in the act of blushing; and then this is only temporary. Whatever influence these nerves may possess over the circulation, is only produced through the medium of the organic or ganglial nervous tissue distributed to the capillaries and structures generally. This provision is important as respects the preservation of the healthy functions of parts; for if the vascular system were *directly* under the dominion of the cerebro-spinal nervous system, all the functions of circulation, secretion, nutrition, &c., which are subjected to the organic nervous influence, would be liable to continual derangement from the various impulses of the will and the passions. — From this it will appear manifest, that changes in the cerebro-spinal nerves of an organ, or part, can have but little effect in the production of inflammation, whilst alterations of the organic nervous influence or sensibility are almost, if not altogether, necessary to its existence. In cases of severe injury to the spinal chord causing paraplegia, the lower extremities are not more liable to inflammation than in health.

153. *b. The causes being of an exciting nature, the primary effect on the organic nervous influence, and on the capillary circulation, will partly or chiefly consist of excitement, — the sthenic states of inflammation generally resulting.* — Whenever the causes of inflammation, either directly or indirectly, are of an exciting kind, — whenever excitement is even one only of the effects produced by them, — we must admit that the vital influence of the organic nervous tissue of the part upon which these causes act, will be increased for a time by them; the excitement being, however, modified by their nature. The organic nervous tissue, supplying the capillary vessels of the affected organ, will especially manifest this effect in the altered action of these vessels. Whenever the organic nervous influence is locally increased, the vital actions of the associated capillary vessels are also augmented — the diameter of these vessels becoming enlarged, and a larger column of blood circulating in them with increased velocity. This is evinced during excitation of secreting surfaces and of erectile parts, and by the enlargement of the nerves and blood-vessels of the uterus after impregnation. That the principal part of the more direct effects produced by the application of stimulants to living structures consists of exaltation or excitement of the organic nervous tissue, causing increased action of the vessels, is proved also by the phenomena observed to follow such applications to organs or parts supplied either chiefly or only by organic or ganglial nerves. Now, if we admit, what cannot be disproved, that excitement of the organic nervous influence of a part increases the vascular activity and circulation of that part, it must necessarily follow that, whenever an increase in degree forms a part of the change induced in this influence by the causes of inflammation, a proportionate augmentation of the size of the capillaries will take place — an active expansion, or turgescence, of the extreme vessels will result, and give rise to states of inflammation of a more or less sthenic character, according to concomitant circumstances, either extrinsic or intrinsic, in respect of the peson affected. But that the causes of sthenic inflammations do not merely excite the susceptible nervous tissue, and consequently vascular action, but also otherwise change the former, and consecutively the latter, is proved by the duration of the resulting effects, and by the succession of alterations, both local and general, as above described.

154. *c. In sthenic inflammations, organic nervous influence, and vascular action, are not only primarily increased, but also otherwise changed.* — In the early stage of all inflammations, there is every reason to suppose that the organic nervous influence of the capillaries and inflamed part is not merely changed in degree, but that it is also modified in kind; and that the differences existing, not only in the forms and varieties, but also in the stages, of inflammation, depend upon the extent and combination of these changes, — an excited, and at the same time a modified, kind of influence especially characterising the sthenic forms of this disease; the combination of impaired and altered influence with excited action constituting the more active states of the asthenic varieties. The irritant or other cause of inflammation

seems to impress the organic or vital influence, or the ganglial nervous tissue, of the part, or of the system more generally, in such a manner as to prevent this influence, and the vascular disorder produced by it, from returning to the natural state, at least for a considerable time. Morbidly excited action is thus induced in the capillaries of a part, particularly in the sthenic forms of the disease, and is succeeded by other changes. When the exciting cause alters the organic nervous influence in other modes, the capillaries are co-ordinately affected. If this influence is depressed as well as otherwise altered, locally or generally, either by the operation of the cause, or by pre-existing disorder, a state of action characterised by deficient power is the result. The specific forms which inflammation assumes when arising from certain causes, particularly from infection or inoculation, depends upon the mode or nature of the morbid impression made upon the organic nervous tissue of the part, especially that distributed upon, or interwoven with, the capillaries. The causes may act by their continued presence; thus irritating bodies, or the lesions of structure produced by chemical agents or by injury, may prove sources of irritation to the nerves and capillaries of a part; but more frequently the exciting causes change, by the impression made at first by them, the degree, mode, or state of influence exerted by the organic nervous tissue upon the capillaries and smaller vessels, and upon the fluid circulating in them; the resulting morbid action presenting corresponding and peculiar characters in respect of kind, degree, and power or tone. This is more remarkable in the more specific forms of inflammation, either produced by certain poisonous agents, or attending some constitutional maladies.

155. In experiments upon living tissues, the effects produced by various stimulants and astringents have in some respects been misinterpreted by the experimenters; and the slight constriction of the capillaries that directly follows the application of such substances, and before the dilatation which subsequently occurs, has been viewed as the first part of the inflammatory act. But this effect depends upon the action of these substances, particularly of turpentine, alcohol, the salts, and many others, upon the vital contractility of the tissues and extreme vessels. The instant effect of these is more or less constriction of the capillaries; but this very soon ceases, the natural state, or expansion beyond it, soon following. When the substance employed is of an irritating nature, without any astringent property, an enlargement of the capillaries is the next phenomenon to follow the impression made by it upon the organic nervous tissues; this impression being frequently rendered instantly and acutely sensible. In observations or experiments made upon the living tissues, care should be taken to distinguish between the effects produced, — 1st, upon the organic sensibility; — 2d, upon the organic contractility; — and, 3d, upon the physical properties of the tissues — upon their cohesion, elasticity, &c., or upon the properties which animal substances continue to manifest some time after death. The *first* of these ceases instantly with dissolution; — the *second* remains for a short time afterwards, but is soon exhausted by strong stimuli; — and the *third* continue much longer, but gradually disappear with the supervention of decomposition, yet admit of being more or less preserved and somewhat modified by various substances of an astringent and antiseptic nature. In the investigation of the nature of the changes in living structures, usually called inflammatory, the intimate relation existing between these changes, and the causes which induced them, should not be overlooked. The mode of operation of the causes, especially with reference to the vital and physical properties just enumerated, and to the local and general circulation, ought to be strictly regarded; and the manner in which the results may be modified by constitutional predisposition should be taken into account.

156. *d. The state of circulation in the early stages of sthenic inflammations.* — The primary affection of the organic nervous tissue having been shown to be one of *morbid excitement in the sthenic forms of inflammation*, and the effects of this excitement to be *turgescence, enlargement, or active expansion of the capillaries*, it next remains to inquire as to *the state of the circulation in the enlarged vessels.* This topic has been much discussed, for observations of the current of blood in the capillaries are liable to error; and besides, the flow of blood may be retarded at a single point, and greatly accelerated at others, particularly when inflammation is produced by mechanical or chemical agents. The state of circulation also undergoes a succession of changes, as will be hereafter shown, with the progress of the disease. It will not be denied that the organic or ganglial nervous tissue exerts a manifest influence, not only upon the capillary circulation, but also upon the blood itself; and that the secreting and other organic functions are under the dominion of this part of the nervous system. It consequently follows, that excitement, depression, or other affections of this influence, will produce co-ordinate changes, not only in the capillaries and related vessels of a part, but also in the state of circulation and in the blood in them. During excitement of the organic nervous functions of an organ, the vessels experience not only an expansion, but also an increase of tone — a vital turgescence. The capillaries, although increased in diameter, still retain the power of reacting insensibly upon the blood propelled into them, so as to preserve, if not to accelerate, the rapidity of the currents passing through them. The necessary result of these states is an increased flow of blood, and a rise of temperature, and these effects continue until the excitement is exhausted, — varying, however, in feature as well as in continuance, and more especially in the associated phenomena and consequences, with the mode or kind of excitement directly resulting from its cause.

157. When the propelling power of the heart and the tonicity of the larger arteries give rise to an increased *vis à tergo*, and particularly when the expansion of the extreme vessels is such as to allow a portion of their contents to escape through the delicate or imperfect canals in which they terminate, or when an obstacle is opposed to the return of the blood through the veins, a portion of the red particles escapes with the serum into the inflamed tissue, generally at minute or distinct points. This is observed especially when the tone of the capillaries in an inflamed part is exhausted, either by the nature of the exciting cause, or by

the previous excessive excitement, before the increased action of the heart has subsided.

158. *e. Of the development of new vessels in inflamed parts.* — It is not only the vital turgescence or expansion of the capillaries, so that those which could not admit the coloured globules of the blood in the healthy state readily admit them in an inflamed part, but also the developement of new vessels that is often observed. But this latter event takes place chiefly in serous membranes, and especially in albuminous exudations from the inflamed surface. It possibly may also occur in other parts, to a more limited extent, although it does not admit of so obvious a demonstration as in these. It can only occur in the various grades of sthenic inflammation, and it fully evinces that, although truly morbid in its nature, this form of the disease is characterised by vital activity, and by a deranged increase of the formative process in the affected part. In asthenic inflammations, however much capillary canals may be enlarged so as to admit a greater column of blood, no new vessels are developed, unless the asthenic be converted into the sthenic state. In the former state of disease, the expansion is the result of impaired vital tone and resistance, both of the capillaries and of the tissues affected; and the organic nervous power of the part, and the action of the capillaries upon their contents, are incapable of forming either coagulable lymph or new vessels. In the latter state, nervous power and vascular action are capable of producing the one, and often also the other.

159. When sthenic inflammation affects serous membranes, the morbid exudation thereby formed on their surfaces is sufficiently consistent to admit of the extension or growth of new vessels from those which had become enlarged in the early stages of the inflammatory act, and to give them support until they acquire considerable development. But when the asthenic disease implicates these membranes, the secretion from their surfaces is too watery or serous to furnish consistent canals or channels in which the contents of the capillaries may be conveyed beyond those which are morbidly enlarged, without commingling with the rest of the effused matter. In cases where new vessels form, the exuded lymph or albumen, into which they run, is not only to a certain extent consistent, but also somewhat scanty, or at least not very abundant; but in cases where they cannot be formed, the fluid effused is generally both serous and copious.

160. The production of new vessels in parts sthenically inflamed, particularly in exudations of lymph, is observed chiefly in young persons, and especially in these who are in the course of development. Occasionally the new vessels are numerous and distinct, even before the lymph had become at all abundant or consistent. In some very beautiful injected preparations by Mr. Kiernan, the eminent pathologist, that he kindly showed me, this was most remarkably demonstrated; as well as the fact, which has been controverted by some French pathologists, that the new vessels shoot out from the inflamed surface, if not from those enlarged in the early stage of the inflammatory act. When new vessels form in the fibrinous lymph exuded from serous membranes, they may often be injected,—the continuity of these vessels with those of the affected part being thereby clearly shown. Yet the most vascular part of the newly organised false membrane may not be that nearest the seat of inflammation,—the new vessels forming several anastomoses, and occasionally becoming enlarged in some places at a distance from the surface whence they were produced.

161. *f. Consecutive changes in the sthenic forms.* — The successive changes taking place in the course of sthenic inflammations are conformable with the laws of the animal economy. The excitement produced in the organic nervous tissue and capillaries of the part is exhausted with a rapidity, and to an extent, in proportion to its intensity relatively to the powers of the constitution, and of the part affected; and as the exhaustion proceeds, the tonicity of the extreme vessels and of the diseased tissue, as well as the vital cohesion of both, is weakened, the circulation through them retarded, and the colour of the blood deepened. The extent to which these changes take place, in connection with the degree of general vascular action, and of constitutional power, fully accounts for the lesions consequent upon sthenic inflammations. When phlegmasia arises from specific causes, the kind of morbid excitement primarily induced by them will, according to their nature, more or less modify these changes, and give rise to certain results in preference to others. We perceive this in the exanthemata and in various inflammatory diseases. The tissue affected will also modify the continuance and mode, as well as the consequences, of the morbid excitement. But there can be no doubt that the successive alterations in the inflamed structures are merely consequences of the morbid impressions made by the exciting causes upon the organic nervous tissue, particularly in its connection with the capillaries; the states of these and the connected vessels, of the circulation through them, of the blood, and of the diseased part, being the effects which may either disappear before the vital resistance of the frame, or terminate in any of the ways described above (§ 39, *et seq.*).

162. *B. Of the Nature of the Asthenic States.*— The remarks which I have just offered more especially refer to the *nature of the more sthenic inflammations*, and it is, therefore, necessary to consider *the circumstances in which the asthenic states differ from these.* It has been shown that these states proceed chiefly from constitutional predisposition, or from previous or associated disorder, or from the nature of the exciting cause. In either case, the organic nervous influence, and, consequently, the tone or vital contractility of the tissues and capillaries in the seat of the disease, are quickly exhausted or readily depressed, and soon become otherwise morbidly affected,— effusion, softening, disorganisation, or gangrene, taking place with a rapidity in proportion to the primary vital depression, or to consequent exhaustion, and to the nature of the impression made by the exciting cause. In cases of asthenic inflammation, either there has been originally, or acquired, great debility or deficiency of the organic nervous power, or the assimilating and excreting functions have been long disordered and imperfectly performed, or the exciting cause has been of a powerfully depressing or poisonous nature. Indeed, two, or even all, of these circumstances may be concerned, each more or less, in the production of some one or other of the morbid states of action comprised under the

more generic appellation, asthenic inflammation. Owing to one or more of these circumstances, the vital contractility of the capillaries and tissues of the affected part is impaired; vital cohesion is weakened, so as to occasion remarkable softening and friability of the structures; the tone of the extreme vessels is so far lessened as to admit the effusion, and percolation through the more yielding tissues, of the more serous portions of their contents, sometimes coloured by red particles; the vital resistance of the capillaries, owing to the loss of tone, is insufficient either to resist even the weakened impetus of the blood, or to react upon it so as to carry on the circulation through them and the venous capillaries; and, ultimately, increased effusion, retardation or stagnation of the blood in the minute vessels, and all the consequences shown to result from the asthenic forms of inflammation (§ 70, *et seq.*), take place. Throughout the course of asthenic inflammations, the states of organic nervous influence, of vital action in the extreme vessels, and of the circulation in the affected part, are incompatible with the production of coagulable lymph; and hence the effused fluid infiltrates the more soft surrounding tissues, and, owing to its morbid condition, caused by the states of vital action and of the blood, contaminates them, or promotes their disorganisation.

163. The *distension* of the capillaries in asthenic inflammations is referable to impaired or lost tone, rather than to an active vital expansion or turgescence similar to that which characterises the early stages of sthenic inflammations; or, if the latter state exist at first, as it probably does for a very short time, in the less asthenic cases, it soon exhausts itself, and passes into atonic distension, with retarded circulation. But there is every reason to infer, that the current of the blood is impeded or retarded in the capillaries at an early stage, or even from the commencement, of many cases of asthenic inflammation, particularly those caused by septic agents or animal poisons; and that the blood soon becomes stagnant in them, the various consequences, already noticed, appearing according to the intensity and rapidity of the previous changes upon which this has been shown to depend. In proportion, generally, as the circulation is retarded in the extreme vessels, the temperature of the inflamed part sinks, and the colour becomes deep or livid, until a purplish or brown hue is acquired. As soon as these changes take place, disorganisation soon follows, and proceeds with a rapidity in proportion to the weakness of vital power and resistance. If the organic nervous energy be aroused or reinforced by appropriate constitutional and local means, the mischief may be arrested, unless it have already proceeded beyond the powers of restoration, and it may be ultimately remedied, as in the advanced stages of sthenic inflammations. When the asthenic forms are arrested at an advanced stage, they generally assume more or less of the characters of the sthenic condition, reparation taking place as in that form of the disease.

164. *C. Of the Intermediate States of Vascular Action and Vital Power in Inflamed Parts.* — As shown in the article Disease (§ 87, *et seq.*), the states of organic nervous influence and vascular action do not always present specific grades or forms, which certain terms can precisely represent. The terms applied to morbid action are entirely relative; and whilst we use the appellations *sthenic* and *asthenic*, to convey an idea of the more extreme and opposite states of nervous power, and of vascular action, we must not overlook that every intermediate form and grade may exist between them. To describe states, so diversified as these are, is obviously impossible. All that can be attempted is to notice certain circumstances generally appertaining to them. — The organic nervous power, evinced by certain inflammations, may not materially vary in *kind* from the natural standard or condition, and yet vascular action may be excessive and very acute, or much more moderate, and, consequently, more protracted, or slight, and more or less chronic. The forms of inflammation, particularly as respects the acute, chronic, and intermediate or sub-acute states, result chiefly from the grades of organic nervous excitement and vascular action; whilst the more specific characters which they present depend principally upon the conditions of the organic nervous energy, as regards not only the *amount* of the excitement or depression, but especially the alterations or *deflections in kind* from the natural habitudes of this energy. Whilst the *activity* of the inflammation depends chiefly upon the grade of vascular action in the inflamed part, in connection with the degree of general vascular commotion, the *specific character* of inflammation arises principally from the truly diseased impression made upon the organic nervous tissue of the part, and from the change thereby effected in the influence of this tissue on the vascular system, such change being in the kind, rather than in the degree, of organic nervous influence.

165. The varieties of Erysipelas, the local inflammations attending the different *exanthemata*, and, indeed, the numerous specific forms of inflammatory action induced by these and other infections or animal poisons, are illustrations of alterations in the *kind* or *mode*, rather than in the *degree*, of local and general organic nervous energy and vascular action. In these, and in all the asthenic states of inflammation, there is a much more remarkable alteration in kind from the natural standard than in the sthenic forms. The *intermediate states* between the most fully expressed sthenic and asthenic conditions depend chiefly upon specific or other deviations in kind — *upon the truly morbid changes* now contended for, especially such as immediately proceed from the nature of the exciting causes, or from contagion. The principal of these, owing to their specific form, are fully discussed under appropriate heads.

166. *D. Of the Existence of different States of Capillary Tone and Circulation in the same Inflamed Part and the Vicinity.* — Much of the discussion which has taken place as to the capillary circulation in inflamed parts has been owing to the variations in this state during the course of the disease, and to the different vital conditions of the capillaries and of the small arteries, in different parts, or in the several tissues comprised in the seat of inflammation. — When compound or parenchymatous structures are inflamed, such differences or variations are the most remarkable, particularly if the disease has commenced at a single point. At this point, especially, the tone of the capillaries becomes the soonest exhausted, and the current of the blood retarded; and these states increase the vital turgescence of the surrounding

vessels, and accelerate the circulation through them. When the substance of an organ is inflamed, the fibrinous lymph exuded at the point first affected, often retards, by its pressure, the circulation in the vessels at this point; and owing to this obstruction, the surrounding vessels are the more readily developed, and more prone to become morbidly turgescent. The lymph effused also affects the vitality of the part, either occasioning more or less irritation to the organic nervous tissue, or perpetuating or modifying the disorder of this tissue already existing, that caused its effusion. Müller thinks that the lymph coagulates in the extreme capillaries, when the inflammation is seated in the substance of an organ; but I believe that it is exuded in the areolæ of the structure, thereby rendering the part more solid or dense; the change thus produced having been termed condensation, solidification, hepatisation, or splenification, according to the appearances assumed, and to the organ affected. It is only in the sthenic forms of inflammation that the effused fluid gives rise to these changes, as shown above.

167. If the intensity of the morbid action in the spot first affected be so great as to exhaust its organic nervous power or its vitality, and to retard its circulation, or to stagnate the blood in the capillaries, not only do the surrounding vessels become more turgescent and developed, but the blood which has thus stagnated, and the tissue itself, undergo very material changes, as described above (§ [illegible].). Hence very opposite states of the circulation generally exist in different parts of the seat of inflammation, especially when the disease is advanced. In cases of injury, particularly of laceration, pressure, or other changes, the capillary circulation is often directly obstructed; and either independently of lesion of the organic nervous tissue and sensibility, or aided by such lesion, diseased vascular turgescence is thereby developed around the seat of injury,—the capillaries thus obstructed, and the blood contained in them, soon undergoing changes productive of suppuration, or ulceration, or gangrene, whilst sthenic vascular action is either proceeding in the surrounding turgescent vessels, or passing into exhaustion or into the asthenic condition, progressively from the point of injury, or from the spot first affected, according as the constitutional powers may resist, or may favour, the extension of the mischief.

168. *E. Of the State of the Venous Circulation in Inflamed Parts.* — There is every reason to believe that the venous circulation is locally more than usually active in the sthenic and acute forms of inflammation; but that it is more or less languid in the asthenic varieties. When the former, also, goes on to suppuration, and especially to ulceration, the circulation in the veins, more immediately proceeding from the part, is generally somewhat retarded, the retardation increasing these changes. Hence the importance of favouring the return of blood from the part by position, when these consequences of inflammation have taken place. Whenever the venous circulation is obstructed, effusion and œdema increase rapidly in the part affected, and in its vicinity; and the consequent retardation or stagnation of the blood in the capillaries, induces or accelerates disorganisation. This is observed very frequently in erysipelas, and constantly when the inflammatory action extends to the veins — which not infrequently occurs when the constitutional powers are depressed, or in the more asthenic forms of the disease. In such cases the local lesions are remarkably increased, not only by the stasis of blood in the capillaries, but also by the more copious morbid effusion caused by the obstructed return of blood.

169. *F. Of the Function of Absorption in the Seat of Inflammation.* — In the early stages of sthenic inflammation especially, absorption seems to be less than usually active; but, when the disease proceeds to ulceration, or even to suppuration, and when it assumes asthenic forms, then the absorbent action is often increased, although there are numerous exceptions to this, absorption sometimes being manifestly impaired. When the absorbents become inflamed, owing to the morbid nature of the cause, or of the matter formed in the primary seat of disease, then more or less of obstruction results, and the function is arrested, great tumefaction of the parts beyond the obstruction taking place, and increasing the local mischief by pressure and by the contaminating influence of the morbid secretion. In obstructed venous circulation the swelling increases rapidly, chiefly from augmented effusion; in impeded absorption it advances with nearly equal rapidity, from the fluid being undiminished by removal. In either case the effused fluid undergoes material changes during its retention, and becomes more and more hurtful to the tissues containing it, and more irritating to the vessels which may absorb it.

170. It was supposed by John Hunter and others, that *ulceration* depends upon increased activity of the absorbents of the part, when inflammation has reached a certain period of its progress. But I believe that it is chiefly owing to the superficial softening or loss of the vital cohesion at that part of the inflamed tissue where the extreme vessels have lost their functions, and to the solution of the molecules of the tissues in the fluid effused from the diseased surface (§ 48.). Absorption is probably also concerned in the process, and in various degrees, according to the seat of the inflammation, and the states of organic nervous or constitutional power and of vascular action.

171. *G. Of the States of the Blood in the Capillaries of Inflamed Parts.* — The blood circulating in inflamed parts presents very different appearances with the form and stage of the disease. In the sthenic forms, and particularly in the early stages, before any of the more unfavourable consequences have supervened, the blood is florid, and partakes much of the characters of arterial blood; but in the asthenic forms, and less remarkably in the advanced stages of the sthenic, it is more venous, or of a darker hue. It is sometimes quite purplish, or blackish, particularly when a tendency to sphacelation or gangrene occurs. Also, as it circulates in the capillaries, the globules seem, under the microscope, gradually to move more slowly, and to be attracted by the sides of the vessel, or to stagnate in the capillary canals. This change seems to commence in the smaller or capillary veins, and to extend, especially in the asthenic states of inflammation, in the direction of the minute arteries, the temperature sinking with the deepening of the hue, and with the loss of motion of the blood-globules. In other respects the

blood presents the appearances already described with reference to the different forms of inflammation. (See § 25. 66.)

172. iii. Of Reparation of the Consequences of Inflammation. — Reparation of the effects of inflammation is accomplished only under the influence of life, although much assisted by art. It may be very briefly considered, with reference, 1st, to the removal of those changes more immediately resulting from inflammation that are independent of loss of substance; and, 2d, to the restoration of disorganised or of lost parts, where either has taken place. Whether morbid depositions are to be removed, or losses of substance are to be supplied, restoration of the manifestations of life in the various organs to their healthy states is the chief intention to be fulfilled. Frequently nothing more than the subsidence of the morbid action in the affected part is necessary to the reparation of the injury done; but often something more is requisite, and the aids of science are needed to assist in the work of restoration.

173. *a.* The *softening*, or impaired vital cohesion of the inflamed part, the *fluids effused* in the areolæ of the tissue, and the coagulated lymph thrown out upon a serous surface, or poured into the porous structure of an organ, so as to solidify it, will generally be removed, when the morbid action which caused these changes has altogether subsided. With the return of the functions of the part, the vital cohesion will be restored, and the activity of absorption will gradually remove the fluids effused in the substance, or upon the surface, of an organ. If the lymph have become partially organised, or have formed false membranes on serous tissues, or have agglutinated the opposing surfaces of shut cavities, the difficulty of removal will be increased, and the time of effecting it prolonged. But if the inflammatory action be entirely subdued, the object will be ultimately attained, and with a rapidity and certainty in proportion to the restoration of the powers of life throughout the frame. Even when the coagulated albumen is organised into false membranes, or into cellular adhesions, their extent and their vascularity will gradually diminish, and they will either entirely and slowly disappear, or become merely lax bands, or thin films, offering little or no impediment to the functions of the parts which they connect. Yet, where such adhesions form, a disposition to returning inflammation will generally exist, or the morbid action which produced them will continue in a much slighter and chronic state. It is chiefly to these circumstances that most of the unfavourable results consequent upon adhesions are owing. The lymph effused in the areolæ of a parenchymatous viscus, as in hepatisation or splenification of the lungs in pneumonia, is commonly soon removed with the subsidence of the disease, and much more rapidly and certainly than the lymph poured out upon a serous surface. The albuminous exudations sometimes formed on mucous membranes very rarely or never become organised, but are detached and thrown off as the diseased action subsides, by an increased secretion of mucus from the follicles underneath. In the course, however, of their excretion from the canals which those membranes cover, they often occasion remarkable disturbance, severe spasms, or even death by asphyxia, especially when they form on the respiratory surfaces, as in *croup*, *laryngitis*, &c.

174. *b.* When the organic nervous and vital powers continue but little impaired, serous and albuminous fluids effused during inflammation are generally removed upon the subsidence of diseased action, although the rapidity and completeness of removal will depend much upon the nature, consistence, and extent of the effusion, and the states of constitutional energy. If the fluid is truly purulent, and especially if it form an encysted or circumscribed *abscess*, restoration is then generally difficult, and only to be accomplished, particularly when the collection is deep-seated, either by absorption, or by the extension of the abscess to an external or internal surface, as is fully shown in the art. Abscess (§ 30.). When the fluid of an abscess is absorbed, nothing but a firm cicatrix, generally linear, or irregular and circumscribed, is observed in its former seat. But when it finds its way to a surface and is evacuated, either the patient sinks under the local lesion and discharge, and the constitutional disturbance, or the work of reparation proceeds under the influence of the vital energies. In this latter case, the discharge from the surface of the abscess becomes albuminous, the parietes contract, and the cavity diminishes. Instead of pus, an albumino-puriform fluid is secreted, which gradually becomes more and more albuminous and scanty. The fluid exuded upon the internal surface of the abscess at last passes into the state of coagulable lymph, under the restoring influence of the organic nervous energy; it becomes vascular, and healthy granulations thus form, and fill up the cavity which the contraction of its parietes is incapable of obliterating; and thus the injury and loss of substance are repaired.

175. In the reparation of *ulcerated* parts a similar process takes place. The softening and solution of the molecules of the tissues in the fluid discharged from the ulcerated part are first arrested by restoring organic nervous energy, by local or constitutional means, or by both. Thereby a more healthy secretion takes place, and suppuration is established, and is followed by granulation in the manner just described, the mischief being thus repaired. Ulceration is most prone to occur, and to proceed rapidly, in parts exposed directly or indirectly to the air, or to the contact of irritating matters; and in those which are most distant from the centre of the circulation, and in which the capillary circulation is naturally weak or slow. Hence it is of importance to the reparation of an ulcerated part, to protect it from those sources of irritation. When an ulcerated surface is extensive, and the tone of its vessels much impaired, the discharge is generally so copious as to detach from it all applications calculated to protect it from irritation, and is so injurious or contaminating as to increase the mischief, if allowed to remain any time in contact with it. The first object in such cases is to restore the organic nervous energy, and tonicity of the capillaries of the part, and thereby to diminish the quantity, and to improve the quality, of the discharge. The fluid subsequently exuded on the diseased surface will often of itself serve as a protection; and applications which restore the tone of the extreme vessels, and diminish or coagulate the discharge, whilst they further protect

the part, will then be of service, complete reparation taking place under the eschars or scabs, sometimes thus formed. In this manner, strong solutions of the nitrate of silver, or other stimulating and astringent substances, often act very beneficially on ulcerated surfaces, whether the discharge coagulate on them or not. But this subject will be more appropriately considered hereafter.

176. *c.* In cases of *divided* or *injured parts*, when the blood, or the fibrinous lymph exuded from the capillaries, coagulates so as to protect them entirely from the air, and without allowing coagula or any other substance to remain that may occasion irritation, the healing process often proceeds without any evidence of phlegmasia taking place. When divided parts are brought in contact, after the hæmorrhage from them has ceased, the lymph exuded from the opposing surfaces will first slightly agglutinate, and afterwards perfectly connect them, small capillary vessels penetrating and organising the connecting medium, which will diminish more and more as it becomes firmly organised. In this process, which has been called by surgeons, "*union by the first intention*," inflammatory action can hardly be said to exist. If it actually take place, very different phenomena present themselves. This process has, however, been described as a consequence of phlegmasia, — probably owing to the circumstance of inflammation actually taking place in some parts or other of the surfaces, the union of which is thus attempted, and which various causes prevent from uniting, and chiefly by exciting inflammation in them. It is very rare that divided surfaces entirely unite without this disease being excited in some portion or other; for incongruous parts or tissues are often brought together, that are incapable of uniting directly. These must necessarily become inflamed, and give rise to the usual consequences of phlegmasia. Moreover the fluids and blood effused from the divided structures, and the ligatures placed upon the larger vessels, are sources of irritation, seldom failing of producing inflammatory action, although the more congruous tissues may have perfectly united. In all such cases, union has taken place in the uninflamed parts only. (See the *Local Treatment of* INFLAMMATION.)

177. VIII. TREATMENT. — The treatment of inflammation must necessarily be guided by a variety of circumstances and considerations. The chief of these refer, — 1st, to the disease itself; 2d, to the individual affected; and, 3d, to the nature of the exciting causes. — *a.* The character, form, progress, and consequences of the inflammation, existing at the time of treatment, should be carefully weighed, as these severally require very different, or even opposite, indications and means. — *b.* The age, strength, temperament, diathesis, habit of body, modes of living and occupations of the patient, ought also to be taken into consideration, and the treatment modified accordingly. — *c.* The exciting causes, the states of constitutional predisposition, and the predominating influences to which the patient is subjected, should be ascertained as fully as possible, and the means of cure selected with strict reference to them. — As the form and character of the inflammation depend chiefly upon the circumstances here alluded to, I shall discuss the treatment which observation has shown me to be most appropriate and successful in each of the principal forms under which I have described this important class of diseases.

178. i. TREATMENT OF STHENIC INFLAMMATIONS. — *A. Acute Phlegmasia.* — *a. At an early stage* of all sthenic inflammations, the *indications of cure* are — 1st, to lower general and local vascular action; 2d, to equalise the circulation, and to derive from the seat of disease. Several of the means which are employed to fulfil the *first*, also often accomplish the *second* indication.

179. (*a*) *In order to lower general and local action*, numerous agents are usually prescribed according to the peculiarities of the case. These operate either upon the system in general, and indirectly upon the part affected, or immediately upon the latter, and consecutively upon the former, according to their natures, and the manner of employing them. — *a.* Of those which act in the first of these modes, *bloodletting* is one of the most important. It has been, however, very much abused; and the cure of inflammations has too generally been attempted by it chiefly, or even alone. There are numerous circumstances which either very remarkably limit, or entirely contra-indicate, the employment of bloodletting, in those morbid conditions in general, which have been all denominated inflammation, although differing greatly from each other; and even in this, the least equivocal form of the disease, there are many considerations which should weigh with the practitioner in limiting the amount of the depletion on the one hand, or in inducing him to carry it far on the other. The extent to which it may be prescribed should be determined by the age, strength, temperament, diathesis, and habit of body of the patient; — by the constitutional symptoms; — by the vital importance and structure of the part affected; — by the duration of the inflammation; — by the states of the pulse and of the blood first drawn; — by the effects produced by a former depletion; — and by the condition of the tongue, skin, and urine.

180. If the patient be young and robust, and well nourished — if the disease be very acute, or seated in a vital organ, or serous surface — and if the constitutional affection be of a manifestly sthenic kind, — the quantity of blood taken at first should be very considerable, and it ought to be taken in such a manner as to make a decided impression upon the circulating system as soon as possible — or in a large and full stream, so that the rapidity of the abstraction may assist the quantity in the effects produced upon the disease. As I have recommended in the article BLOOD (§ 64.), the depletion should be effected whilst the patient is in a semi-erect or semi-recumbent posture, in order that the desired approach to syncope may be more certainly produced, without, however, causing syncope, for the reasons fully explained in the article just referred to. — The first abstraction of blood ought to be instantly followed by the means about to be noticed (§ 196.); but the circumstances now stated as demanding a full or large depletion in the first instance, will require a repetition of it, generally to a less amount, but in strict reference to the local and constitutional symptoms, to the effects produced, to the time which has elapsed from the first

bloodletting, and to the appearance of the blood then taken away.

181. The *pulse*, the *blood*, and the character of the *pain* in inflammations, furnish many useful indications as to the *institution*, the *repetition*, and the *amount* of *depletion;* but they may mislead most remarkably, if the numerous exceptions they afford, and the circumstances in which these exceptions occur, be not taken into account. — In inflammations of vital organs, and particularly of the stomach, of the intestines, or of the substance of the brain or liver, the very intensity of the disease may produce so severe an effect upon the constitution, — so violent a shock to the vital powers, — as to deprive the *pulse* of firmness or tone, and to cause not only an oppressed, but also a weak, small, slow, or an irregular, state of pulse. In such cases the practitioner must not be deterred from bloodletting by this circumstance; for after a few ounces of blood are abstracted, the pulse will become more full, strong, and regular. In all inflammations, especially of vital parts, depletions should be performed with a most attentive regard to the phenomena whilst the blood is flowing; and in cases similar to those alluded to, the effects ought to be most assiduously watched. If the pulse rise in strength, and especially if it become hard, as well as developed or full, the bloodletting may even at first be carried so far, as to make an impression upon the circulation, and to reduce the pulse again in strength and fulness. — When the pulse is open and throbbing, or jerking, as generally observed after copious hæmorrhages, bloodletting will rarely be of benefit, although it has not been already resorted to, and it may be most injurious. Where a moderate bloodletting produces sinking or syncope, without affording relief, it will be injurious to pursue the practice further, if, indeed, it has not already been prejudicial.

182. A hard, tense, or strong pulse, not only requires a very copious depletion at first, but generally also a repetition of it. If a pulse, which was too frequent and too full, is reduced in these respects — or if a hard, constricted, or small pulse is softer and freer — or if a pulse hitherto slow and oppressed has become more natural, — it may be concluded that the bleeding has been of service, and that it may be safely repeated to a less amount, if the symptoms require it. If, on the contrary, the pulse has become weak, hurried, compressible, open, jerking, irregular, or intermittent, without producing relief, the bleeding has already proved injurious, and a repetition of it would be productive of danger. It may be taken as a general rule, that when the pulse is above 110 and compressible, whatever may be the organ inflamed, the system will not bear general bloodletting even in the first instance. The local abstraction of blood, however, with caution, may prove of service.

183. The *appearances of the blood* first abstracted have generally influenced the physician more or less in prescribing a repetition of depletion. But they ought to be considered in strict connection with the other symptoms. The appearances most deserving of notice are — the firmness or looseness of the crassamentum; the proportion it bears to the quantity of the serum; and the presence or absence of buffiness, and cupping of its surface. In the article BLOOD (§ 96, 97.), and in a previous section (§ 25.), I have fully discussed the appearances of the blood indicative of sthenic inflammations. These should receive attention in practice; but I may here remark, that although a cupped and buffed state of the crassamentum is evidence of an excited state of the circulation, and very frequently attends inflammation, yet alone, or without the presence of other symptoms indicating the propriety of bloodletting, it is no proof that this measure has been indicated, or that its repetition is requisite. When, however, the crassamentum is large, firm, or dense, and the buffy coat is considerable, thick, firm, and tenacious, the other signs of inflammation being present, depletion may be repeated, and occasionally oftener than once. If the clot be loose, has a thin or an irregular edge, and especially if it be small relatively to the quantity of the serum, a repetition of depletion will be injurious. In all cases the appearance of the blood depends much upon the manner in which it is taken, — especially upon the size of the orifice, the posture of the patient whilst the blood flows, and the shape and size of the vessel in which it is received. A buffy, cupped, and firm coagulum will form in a deep or narrow vessel, particularly if the blood flow rapidly; whilst neither of these appearances will occur if it be received in a wide and shallow vessel.

184. The *pain* and other local symptoms ought also to guide the practitioner as to the extent to which depletion should be carried. But these should not be exclusively confided in, for the most violent pains, as shown above (§ 82.), are generally independent of inflammation, and are not abated by vascular depletions. Nor are all alterations of sensibility depending upon inflammations to be relieved by bloodletting; for the most severe pains accompanying asthenic inflammations will very often not be even mitigated by it, although altered sensibility in the sthenic forms, now more especially under consideration, will generally be entirely removed by it, if it be actively and judiciously practiced. As long as pain and tenderness on pressure continue, the pulse being firm, resistant, or constricted, and not very frequent, general bloodletting may be repeated, although some exceptions to this rule may present themselves; but in most of these, local depletions may be employed. If the pain return after having disappeared, or if it become exasperated, although bloodletting has been instituted, a repetition of the measure is necessary, unless the other symptoms obviously forbid it; for, in this latter case especially, the first depletion has only relieved the load which overwhelmed the sensibility of the organ, and a second, or even a third, is requisite to restore the circulation of the part to its healthy state.

185. The *absence of pain* ought to be no argument against resorting to vascular depletion, if other symptoms indicate the propriety of it; for intense inflammation may exist in the parenchyma of an organ, particularly the brain, the liver, the lungs, or the kidneys, and even in mucous or serous membranes, without pain being complained of, or without sensibility being further disturbed than is indicated by a feeling of heat, or of oppression, or of weight.

186. The *functions* of the inflamed organ ought also to indicate the propriety of repeating deple-

tion. When they are restored, then the chief object is attained, and no further loss of blood should be inflicted on the patient; but if they continue to be suspended or disordered, or if they are only partially restored or improved, local depletions, at least, are required, especially if due time have been allowed for the first bleeding to produce its effects.

187. The *tongue* furnishes important indications as to the propriety of general or local bloodletting. When the papillæ are distinct and erect, the tongue being white or loaded, and inclined to be dry, or its edges or point, more or less red, vascular depletions are generally necessary. When the fur on the tongue is erect and white, and the sides and point red, blood may be taken away, if no symptoms contra-indicate the practice. On the other hand, when the papillæ or the fur is flat, and the tongue very moist or watery on its superior surface; when it is broad, flabby, fissured, or lobulated; when its edges are indented by, or retain the impression of, the teeth; when it is pale, especially at its point or edges; when it is tremulous on being held out; and when it is covered by a thick, dark mucus or fur; bleeding is generally inadmissible.

188. When the *cutaneous surface* is hot and dry throughout, depletion will be of service; but if it be cold, clammy, and shrunk, or if it be covered by a hot clammy perspiration, bloodletting will be inappropriate, as the chief objects intended to be accomplished by bleeding are to lower general action and to produce relaxation, and these are already attained. If the *urine* is high-coloured, scanty, and does not deposit a sediment, bloodletting may be practised, if other symptoms do not contra-indicate it; but if the urine be pale, limpid, and copious, it will generally be injurious.

189. Besides these guides to the institution and repetition of vascular depletion, there are various others, appertaining to the organ affected, &c., which should guide the physician; but these do not come under consideration at this place. The age, constitution, and diathesis of the patient, and the other states of predisposition, as well as the exciting causes, however, require some notice. The very young (infants) and the aged should be depleted with caution. Persons of a nervous or lymphatic temperament cannot bear so large losses of blood as those who are sanguine, irritable, or sanguineo-melancholic. In the gouty and scrofulous, in the previously diseased, in the ill-nourished, in the very obese, and in persons of a relaxed fibre, or leucophlegmatic or cachectic habit of body, such losses are generally injurious.

190. The nature of the *exciting causes*, and the *influences, mental and physical*, operating on the patient during treatment, should greatly influence the amount of vascular depletion. Inflammations consequent upon active excitement, or attending vital reaction, are most benefited by this measure; whilst those caused by septic, poisonous, infectious, or contaminating agents, are generally aggravated by it. All the depressing affections of mind, an air loaded with malaria or paludal exhalations, the foul air of hospitals, and the confined atmosphere of large towns, particularly in crowded dwellings, in low cellars, in close lanes or alleys, and in manufactories, frequently not only prevent the good effects of bleeding from ensuing, but also render its institution or repetition injurious.

191. The *prevailing epidemic constitution*, or the general character presented by epidemic and other diseases, should always be kept in recollection, especially as respects the employment of bloodletting. The inflammations which occur in the puerperal states, erysipelas, and the inflammatory complications observed in the courses of exanthematous and continued fevers, vary remarkably in their particular characters, according to the prevailing constitution. At the period of change from one general constitution to another, it is very difficult at once to determine upon the admissibility of bloodletting, particularly as regards the diseases just named, and others allied to them; but close observation of the morbid phenomena, and attention to the circumstances and considerations now enumerated, will lead to a right determination as to this practice. Generally speaking, also, it will be found, that all inflammatory diseases attended by a free state of the secretions; by copious fluid defluxions, particularly from the seat of disease; by a moist or relaxed skin, or irregularity and weakness of pulse; by physical and mental depression, and especially by great despondency, unfavourable anticipations of the result, or indifference to objects of former or natural endearment; will either not be relieved, or will be aggravated, by bloodletting.

192. β. *Local depletions* are often sufficient in many forms, states, or stages of inflammation, to accomplish the ends in view. The circumstances requiring *local*, in preference to *general bloodletting*, are chiefly the following: — 1st, The slighter states of inflammatory action; — 2d, Forms of the disease approaching to, or partaking of, the asthenic condition; — 3d, A stage of inflammation too far advanced to admit of, or to be benefited by, general depletion; — 4th, When venesection has been carried so far as not to admit of its repetition, the disease being either unsubdued or only mitigated, and requiring to be aided by this means; — 5th, When it is desirable to derive from the seat of disease, as well as to deplete moderately; — 6th, When it is wished to remove local congestion of the vessels, and to restore the sensibilities and functions of the affected part; — and, 7th, When inflammations occur in debilitated, nervous, or delicate constitutions, and as complications of febrile, or other diseases.

193. The *modes* in which local depletion should be performed also require attention. When a considerable quantity of blood is to be abstracted, and it is desirable to effect a rapid derivation from the seat of disease, then *cupping* is to be preferred; but when the quantity is to be small, and when the application of warm fomentations and poultices to the part subsequently is likely to be serviceable, then *leeches* are more appropriate. Where the morbid sensibility and situation of the parts prevent the having recourse to cupping, a large local depletion being requisite, then a great number of leeches should be applied. In such cases the fomentations and poultices used to promote the bleeding will act beneficially in soothing the altered sensibility, upon which much of the diseased action depends. When the part inflamed admits of the direct application of leeches, it is often doubtful whether they should be placed upon it or not; for in some constitutions the punctures of

leeches are followed by much local and general irritation, or even by erysipelatous inflammation; and if a small number be employed, they only increase the local irritation and determination, without unloading the vessels of the diseased part. In these cases, depletion by more or less numerous or deep scarifications is sometimes more beneficial than by leeches, especially if the vessels are much engorged. It should also be recollected that bleeding by leeches occasions much greater depression, relatively to the quantity of blood abstracted, than by any other mode, especially in nervous and susceptible persons; and that in some constitutions and situations the bleeding from their bites is not readily arrested. When the vital tone and cohesion of the tissues are much weakened, as in febrile and malignant diseases, a fatal loss of blood may take place from them, if the bites be not watched for a considerable time after they are removed. In some cases, *cupping over the bites* of leeches is very advantageous, in abstracting both a greater and more determinate quantity of blood, in preventing a prolonged and weakening discharge from them, and in determining the circulation to the part to which they were applied.

194. In visceral or internal inflammation it has often been recommended to apply leeches over the seat of disease; but, unless some advantage be expected from the subsequent fomentation, no additional benefit will result from the selection of this situation; and, if an intimate vascular connection exist between the part inflamed and that to which leeches are applied, the blood may be injuriously determined thereby to the former place. — When the phlegmasia is entirely visceral, the application of leeches to that part of the external surface which is over the seat of disease, probably effects as complete a derivation from it as when applied to any other situation; whilst the subsequent fomentation tends to equalise the general circulation, and to determine to the surface of the body.

195. In conclusion, the propriety or impropriety of repeating bloodletting in inflammation, as well as of adopting it in the first instance, cannot be inferred from one symptom or consideration alone. The constitution, habit of body, and previous state of the patient, the condition of the various functions, the increase or decrease of the pain and other morbid phenomena in the affected part, and the other circumstances stated above, should chiefly influence our decision upon these important points of medical practice.

196. *γ. Calomel and opium*, as so ably recommended by Dr. Hamilton, should be prescribed in a full dose immediately after the first bloodletting, whenever the inflammation presents an active or sthenic form. In acute phlegmasia of a vital or important organ, from ten to twenty grains of calomel, and from two to three of opium, and one grain of ipecacuanha, may be given at once. This combination will generally succeed in keeping down the general morbid action to that grade to which it had been brought by the depletion, and in preventing reaction from following thereupon. It will also relax the cutaneous surface, determine to the skin, and thereby equalise the circulation. In some cases, smaller doses, especially of the calomel, may be given, and repeated every fourth, fifth, sixth, or eighth hour, according to the urgency of the case, until a decided effect is produced upon the disease. In all sthenic inflammations, the specific effect of mercury upon the tongue and gums is not readily produced; but as soon as it begins to appear, the mercurial medicine should be relinquished, or the dose of it reduced. It is chiefly in cachectic persons, and in the asthenic forms of inflammation, particularly when vascular action is languid or low, or when there is but little excitement, that mercurials, especially in large quantities, are injurious. When sthenic phlegmasia is seated in serous membranes, or extends to them, the decided use of mercury in the combination just prescribed, or in others hereafter to be noticed, is most requisite, in order not only to aid in the resolution of the morbid action, but also to prevent effusion, or the exudation of coagulable lymph, and the several ill consequences shown to depend upon effusion in its various states.

197. When inflammation implicates serous, fibrous, or even parenchymatous parts, preparations of *antimony*, especially James's powder or tartar emetic, may be combined with the calomel and opium, particularly for phlegmasia of the serous membranes of the chest and of the brain, and for pneumonia, &c.; but when mucous surfaces are inflamed, especially the intestinal mucous surface, *ipecacuanha* is preferable, and it may be given in large doses, as two, three, or four, or six grains, in the form of pill, with a full dose of opium. In many cases, also, *camphor* will be beneficially conjoined with calomel and opium; but when it is to follow a large depletion, or when sthenic inflammatory action is not fully subdued, it should be prescribed in small doses, so as to act as a refrigerating diaphoretic. It is chiefly in asthenic inflammations that full or large doses of camphor are required.

198. The *repetition* of calomel and opium, with or without either of the other medicines just mentioned, as to frequency, or the intervals between the doses, as well as the quantities of both, should entirely depend upon the intensity, the seat, and the other circumstances of the disease. The largest doses already mentioned should not be frequently repeated, unless in the most urgent cases. In some instances it may even be sufficient to give them only after each depletion, or to prescribe also, in the intervals, smaller quantities, as may be required. In the less severe states of inflammation it will be preferable to prescribe much smaller doses, as from two to five or six grains of calomel, and a quarter or half a grain of opium, every four, six, eight, or twelve hours, according to the peculiarities of the case, in combination with either of the other medicines already noticed. After depletion has been decidedly employed, these doses will generally be sufficient, even in the more severe cases, and will often give complete relief, without affecting the mouth, their good effects being manifested chiefly on the general and local states of action, on the skin, and on other excreting organs.

199. *δ. Purgatives.* — Unless it be desired to produce a very speedy effect upon the system by calomel or other mercurials given in the above combination, an occasional or even frequent recourse to purgative enemata will generally be necessary, although purgatives taken by the mouth may not then be requisite. Purgatives, however, are amongst the most important remedies used in the treatment of inflammations; their good effects depending upon several circum-

stances:—1. They evacuate morbid secretions and fæcal accumulations, which injure the organic functions, and depress or otherwise derange the powers of life, and which thereby favour the extension of the local affection, and increase the constitutional disturbance; — 2. They diminish vascular fulness, by increasing the intestinal exhalations, and the secretions of collatitious organs, and thereby lower febrile action;—3. They determine the blood to the digestive mucous surface, and derive it from remote parts. Owing to this last circumstance, they should be given with due caution when the digestive tube, or even when the viscera associated with it, are inflamed. They are more serviceable in some inflammations than in others; thus they are more efficacious in congestions and inflammations of the head, than in similar affections of the abdominal and thoracic viscera. The selection of, and modes of administering, purgatives, also, are matters of great importance; but are so intimately dependent upon the nature of individual cases, that no general rules can be stated as to these topics. The refrigerant purgatives are usually the most appropriate, as the sulphate of magnesia, and other neutral salts, either alone or with the infusion of senna; the bitartrate of potash with jalap; the spirits of turpentine with castor oil; calomel with the compound extract of colocynth, or with jalap, &c. One of the best modes of administering these medicines is to give them at first, or a few hours after a full dose of calomel or blue pill, in briskly cathartic doses, so as to clear out the bowels, and afterwards to keep up a more gentle action by milder and cooling doses, or by suitable enemata, or by both. The operation, as well as the antiphlogistic effects of these, and of other purgatives that may be employed, will be promoted by adding to them the potassio-tartrate of antimony, or ipecacuanha.

200. ε. *Mercurials.*—Although calomel is one of the best purgatives that can be given in this class of diseases, yet it, as well as other preparations of mercury, is often required for its alterative effects chiefly, not only after bloodletting has been practised, and as above advised (§ 196-8.), but also where depletion should not be adopted. In some cases it is necessary to use every means, and even several simultaneously, in order to arrest the usual course of the disease, particularly in inflammations of serous membranes, and of the larynx, trachea, iris, &c.; and one of these means is the rapid production of the specific effects of mercury. These effects being produced, not only is the resolution of the local morbid action thereby favoured, but also effusion is diminished, and the disposition to form coagulable lymph is entirely prevented. Hence mercurials employed with the view of affecting the system are most useful for inflammations of parts which give rise to albuminous exudations; and are either of little service, or even prejudicial, when prescribed for inflammations of cellular or parenchymatous structures, especially if these assume a diffusive, or spreading, or irritative form. In such cases, other means, hereafter to be noticed, will be found more beneficial. But in acute sthenic inflammations, neither mercury nor any other means should interfere with bloodletting. It may assist in subduing, and in removing, several of the effects of these diseases, but it should never wholly supersede vascular depletion in some form or other. In chronic inflammations, however, where alterations of structure have commenced, and where they are but little influenced by depletion, mercury is one of the most efficient means that can be prescribed for the prevention of further effusion, or other change, and for promoting the absorption of whatever deposition may have already taken place.

201. ζ. *Spirit of turpentine* is hardly known as an antiphlogistic remedy; and yet, from an experience during nearly thirty years of its effects, both in sthenic and asthenic inflammations, I believe that none is more deserving of confidence, if appropriately and prudently prescribed. As I have long ago shown (*Lond. Med. and Phys. Journ.* for July and August, 1820.), the operation of this medicine depends upon the dose, the frequency of the repetition, and the combinations of it with other remedies. Hence it may be made available in every form of inflammation. In the sthenic form it is remarkably serviceable after depletions have been duly practised, and it may be used both internally and externally — in draughts, or in enemata — in liniments, embrocations, or fomentations. In all inflammations tending to copious effusion, or to fibrinous exudation, after bloodletting has been resorted to, and more especially when it becomes doubtful whether general depletion should be prescribed, or repeated, or not, this substance, in hands experienced in its operation, is a most valuable remedy. In these cases it should be given in quantity sufficient to act upon the bowels and kidneys,—either one drachm twice or thrice daily, or from three to six drachms once a day, alone or with castor oil. It may also be administered once or twice a day in enemata in larger quantities. Where it is desired to produce as rapid an impression as possible upon the malady, not only should the one mode of exhibition be made subsidiary to the other, but both should be aided by the external use of this substance, in the form of a warm embrocation, fomentation, or epithem. In such cases I have generally directed several folds of flannel, large in proportion to the extent and severity of the disease, to be wrung as dry as possible out of very hot water, to be instantly freely sprinkled with spirit of turpentine, and applied immediately over the affected organ; to be closely covered, when thus applied, by wash leather, or a dry cloth, to prevent evaporation; to be kept thus applied as long as possible, or as the patient may endure it; and to be renewed as circumstances may require. In less severe cases, or at the commencement of inflammation, I have found a single application of this fomentation instantly arrest the disease, without depletion or any other means beyond a purgative medicine having been employed. In chronic inflammations, the *liniments* containing this substance, prescribed in the Appendix (F. 296. 311.), may be used either as such, or as embrocations, or they may be applied over the affected organ, on the surface of warm flannel, in the way just described.

202. The spirit of turpentine, thus employed internally or externally, or both, need not prevent a recourse to calomel, or other mercurials, but may be used, particularly in the more urgent cases, in conjunction with them,—the former aiding the operation of the latter. Although one of the most efficacious means of arresting inflammation and its consequences, there is no remedy that requires more discrimination and experience of its action

and effects, than this. Much of the disappointment sometimes felt as to its operation has been entirely owing to the inappropriate use of it, and to injudicious modes of prescribing it. The practitioner who is well acquainted with its effects, in the various doses and modes of using it, will find it most effective in lowering general action when inordinately excited; in controlling local disease; in arresting the effusion of morbid fluids consequent thereon; and in determining the momentum of the circulation to the intestinal canal, to the urinary organs, or to the cutaneous surface, according as either effect may be desired; and thereby in deriving from the seat of disease.

203. η. *Refrigerants and diaphoretics.*—Of these, the former are generally used in aid of more active measures, with the view of reducing the increased temperature, which aggravates or perpetuates the local morbid action; and the latter are prescribed with the intention of restoring or increasing the cutaneous functions, of thereby equalising the circulation, and of removing a portion of the serous and excrementitious elements in the blood. In many cases, substances acting both as refrigerants and as diaphoretics are most appropriate, or those which exert the former action more readily produce the latter effect. Indeed, whenever vascular action is sthenically excited, the skin being hot and dry, it is necessary to lower the general action, and to give such substances as act in this manner, as the most certain means of procuring perspiration. In the majority of cases, after vascular depletion and other evacuations have been duly employed, the cooling diaphoretics are thus indicated; and, although more active means may be still requisite, particularly those already described, yet these will generally be found useful when taken in the intervals, or as occasions may offer. The diaphoretics which will be found most beneficial are the solution of the acetate of ammonia, camphor, spirit of nitric æther, and a solution, or the wine, of the potassio-tartrate of antimony, which may be variously combined according to the peculiarities of the case.

204. *Warm, vapour,* and *medicated baths* are amongst the most energetic diaphoretics; but much judgment is required in prescribing them; for their effects will entirely depend upon the form, state, seat, and stage of the inflammation against which they may be employed. In acute sthenic inflammations, they should not be resorted to until vascular depletion has been duly employed, and alvine evacuations freely procured. When, however, the stomach or bowels are inflamed, they may precede the use of means for the evacuation of the latter. In chronic inflammations of the internal viscera, or of the joints, fibrous tissues, &c., vapour baths, various fumigating baths, and particularly those with sulphur or camphor, warm baths, especially those containing the decoctions of emollient herbs, or weak alkaline solutions; aqueous vapour with the fumes of camphor, or this latter conveyed around the patient; may severally be brought most advantageously in aid of other appropriate means.

205. ϑ. *Diuretics* are sometimes required in the treatment of inflammations, not merely on account of any derivation from the seat of disease thereby procured, but with the view of reducing whatever serous plethora may exist; and of removing from the circulation, by increasing the action of the kidneys, those ultimate products of assimilation which are liable to accumulate in the blood to an injurious amount, during the febrile state, and thereby to heighten the local affection. With this intention, several of the more refrigerant diuretics may be advantageously employed, especially the spirits of nitric æther, the bitartrate of potash, and the neutral salts in small doses. They may be taken either in the patient's usual drink, or conjoined with the other medicines required by the particular circumstances of the case.

206. ι. *Narcotics* are occasionally beneficial, especially when inflammation is attended by great pain and irritability, and in the sthenic forms after vascular depletion and alvine evacuations have been duly practised. *Opium* and the *salts of morphia* are the narcotics most frequently prescribed, although *hyoscyamus*, *belladonna*, &c. may likewise be employed in some circumstances.—Opium was much recommended for inflammation by medical writers during the seventeenth and eighteenth centuries, and frequently in combination with other medicines; but its use, or rather its abuse, was also greatly condemned. There are few medicines which require greater discrimination than this, and particularly when given in this class of diseases; for the propriety of having recourse to it will entirely depend upon the seat, stage, and form of the inflammation, upon the constitutional symptoms, upon the means previously employed, and upon the dose and combination in which it is prescribed. Dr. ARMSTRONG advised large doses of opium after bloodletting, in a paper published in 1824 in the "*Transactions of the Associated Apothecaries*," under the belief that the advantages derived from the combination of calomel and opium, recommended by Dr. HAMILTON, were entirely to be ascribed to the latter substance alone. In this, however, he was altogether mistaken; for this single remedy is not nearly so beneficial as in combination with calomel and the other medicines mentioned above (§ 196-8.). Nor, indeed, did the practice present any originality; for it had been employed by numerous writers and practitioners long before he advocated it, even before the periods which I have already assigned. Besides other instances in which I had prescribed it with great benefit previously to this time, I attended a case of phrenitis in 1820, with Mr. CARROLL of Walworth, in which three grains of opium were given at one dose, after bloodletting had been carried sufficiently far. In slighter cases, after vascular depletion and the operation of a cathartic, a large dose of laudanum, or of solid opium, has manifestly aided greatly in tranquillising the nervous system, in reducing vascular action, and in procuring refreshing sleep; the patient awaking with a soft or moist skin, and with freedom from pain. Dr. STOKES has recently adduced evidence in favour of this practice, and shown that it is peculiarly beneficial in cases of recent inflammation of serous and mucous membranes, where bloodletting and other antiphlogistic remedies are inadmissible, and where the system is greatly depressed. In most instances, however, opium, or the salts of morphia, will be more advantageously combined with calomel, as above advised (§ 196-8.), or with ipecacuanha, or with camphor, or with James's powder, or the other preparations of antimony. Where pain is so excessive as to constitute the most prominent symptom, it is a most important remedy. When great exhaustion follows bloodletting, owing to its having been carried too far, or improperly resorted to, opium and camphor con-

joined are most valuable medicines; and in the asthenic forms of inflammation especially should never be overlooked, particularly in conjunction with other means. The salts of morphia in similar combinations will be found equally beneficial.

207. The other narcotics, as *hyoscyamus, conium, stramonium, belladonna*, &c., are less useful in inflammations, and not so generally appropriate as opium; and yet instances often occur, in which a large dose of some one of these, according to the features of the case, may be preferred; and, after bloodletting and alvine evacuations have been duly practised, and in the combinations already mentioned (§ 196-8.), will be found frequently of service. The chief recommendations in favour of these are—the circumstances of their not interrupting or suppressing the functions of secretion and excretion, and of their relaxing spasm of circular fibres and canals, as well as allaying irritation. It should, however, be admitted, that when opium is prescribed in large doses, it does not interrupt secretion or constipate the bowels so remarkably as when given in smaller quantities; and that these effects are then frequently even not observed.

208. *κ. Sedatives.* — Of these, *colchicum* is the most active; and in certain kinds of inflammation especially, as the rheumatic and gouty, the most serviceable, when prudently prescribed. In the sthenic forms, also, of phlegmasia, it may often be advantageously brought in aid of other means. When it is desired to promote the secreting functions of the kidneys, and thereby to eliminate from the blood urea and its combinations, or other materials which would increase the local and general affection, if allowed to accumulate in the blood, then colchicum may be made a valuable remedy. Also, when inflammations are attended by a torpid or obstructed state of the liver, this medicine, conjoined with deobstruent purgatives, will be of essential service. In cases attended by very acute pain, or by the effusion of fluids from the inflamed part, it will also be of service, particularly when judiciously combined with other means; but its action should be carefully watched, as in some constitutions it produces most depressing and even injurious effects. It is best conjoined with camphor, the alkaline carbonates, magnesia, the neutral salts, and other purgatives; and is most serviceable after depletion and alvine evacuations.

209. *Digitalis* has been more generally employed than colchicum in inflammatory complaints, although it is a less efficient, and even a more uncertain, remedy than it. As long as vascular action is acute or sthenic, digitalis, even in large doses, exerts but little influence upon the circulation; whilst its cumulative effects will sometimes appear as soon as the symptomatic fever abates. It is most serviceable as an adjunct to other means, whose operation is more decided and certain, especially where effusion has commenced, or is about to commence, from the diseased part; when inflammation attacks debilitated, cachectic, or delicate persons, who cannot bear general or free bloodletting; and when it assumes slight, chronic, or subacute forms.

210. *The preparations of antimony*, particularly the *potassio-tartrate*, given in large and frequent doses, produce a sedative, or, according to Rasori and his followers, a *contra-stimulant*, effect. After causing vomiting, they act upon the bowels and skin, and reduce the pulse in strength, fulness, and sometimes in frequency. For inflammations of the thoracic viscera, and of the brain and its membranes, a decided and judicious use of these medicines, after due vascular depletion, is generally of great service; but they should never supersede this latter, although they may prevent the having recourse to very large or repeated bloodlettings. In other circumstances, as well as in those just instanced, these preparations are very beneficial, particularly when conjoined with opiates or other narcotics; they lower general and local vascular action, relax the cutaneous surface, favour perspiration, and equalise the circulation.

211. The potassio-tartrate of antimony is seldom prescribed as an emetic in sthenic inflammations, unless in those affecting the respiratory organs and passages. In order to procure its depressing effects, a quarter or a third of a grain is usually given every two or three hours. The first two or three doses may cause vomiting, but nausea and a lax state of the skin and bowels will subsequently be the chief effects. Chronic inflammations are often subdued by this medicine, and the most successful results frequently follow it in delicate constitutions, when bloodletting does not promise any decided advantage. It should not, however, be carelessly employed, as I have seen it productive of the most injurious effects when pushed far in debilitated persons, and in young children. In smaller doses, as from the one fifth to the one tenth of a grain at the same intervals, it produces a salutary diaphoresis. To effect this, however, it is seldom given alone, but is usually conjoined with camphor mixture, solution of the acetate of ammonia, the spirits of nitric æther, and sometimes with a small quantity of sulphate of magnesia or of the nitrate of potash.

212. The employment of large doses of tartar emetic in inflammations originated in Italy; and although it was at first discouraged by British practitioners, yet the experience of the ablest physicians in this country and on the Continent has now fully decided in favour of the practice. Since 1819, I have generally resorted to it in the manner just mentioned, especially in the treatment of inflammations of the respiratory organs, and generally with great benefit. There are few cases which, if promptly treated by bleeding, and subsequently by this medicine, will not be very materially relieved; and in those which have been neglected, or in which the proper time of bleeding has gone by, this substance, with mercury, or with the solution of the acetate of ammonia, or with opium if it irritate the digestive canal, or with other appropriate means, will frequently prove of great service.

213. The empirical powder, introduced by Dr. James, is the next to tartar emetic, as an efficacious preparation of antimony in the treatment of inflammations. The *pulvis antimonii compositus* in the *Pharmacopœia*, which was intended as a substitute for it, cannot be depended upon. The different effects of these medicines have been attributed by Dr. Thomson to the fact of the antimony in the former being a protoxide, which is soluble; in the latter a peroxide, which is insoluble. Mr. Phillips seems to confirm this in his translation of the *Pharmacopœia*. In numerous cases of inflammation, and in many circumstances, *James's powder* should be preferred to any other antimonial. In *children*, particularly those which are very young, and for inflammations of

the pulmonary organs, as well as of the brain and its membranes, in this class of patients, it is generally the best preparation of antimony, and the best sedative, that can be prescribed.

214. *Cold* is one of the most powerful sedatives, and one which is not always judiciously employed. There are few agents which are more efficient in constricting the vessels of the part, than it. Also, by altogether removing the principal stimulus to, as well as the chief consequence of, vascular excitement, namely, increased temperature, it prevents the consequent exhaustion of the tone and vital cohesion of the capillaries and inflamed tissues. Yet, in medical practice, its appropriate use is comparatively limited; for it cannot be brought to act upon the majority of internal inflammations in such a manner as to insure its good effects, or without interfering with other means upon which still greater dependence may be placed. It is also applicable only to the sthenic and acute forms of inflammation; for it is generally injurious in the asthenic and specific varieties, particularly the diffusive, erysipelatous, gouty, and rheumatic. In all cases of visceral inflammation where the application of cold tends to constrict the external surface, and to determine the circulation to internal parts, cold can rarely be advantageously prescribed; for even when employed internally, or in enemata, it can seldom be prevented from superinducing reaction, or be so applied as to keep down vascular action for a continued or prolonged period. It is, however, different with inflammations of the brain or of its membranes; for the comparatively superficial and isolated situation of the diseased parts, their distance from the centre of the circulation, the minute division of the vessels in these organs, and the complete manner in which cold applications may be made to surround the whole seat of disease, — in the form of the cold affusion, the ice-cap, evaporating lotions, &c., — combine to render cold more beneficial in these inflammations, than in any others affecting internal organs.

215. It has likewise been recommended to employ cold in the treatment of other visceral inflammations, as in pneumonia, enteritis, peritonitis, &c. Breathing very cold air has been tried in the first of these by practitioners of the United States of America, and cold applied to the abdomen in the others by Dr. Sutton and by several German physicians, but with very doubtful advantages. Indeed, the results of such practice may be tolerably accurately inferred *à priori*.

216. Amongst other sedatives, mention may be made of the *tepid bath*, and the *tepid affusion* or *douche*. These, by abstracting heat, exert a depressing effect, and slightly constrict the surface. When the heat of skin is very considerable, the pulse being rapid and somewhat hard or resistant, the tepid bath is to be preferred to the warm bath, as it not only cools the surface, but also generally favours diaphoresis with more certainty than this latter. Indeed, in acute sthenic inflammations, the warm bath should not be used of a higher temperature than 96°, unless in cases presenting peculiar features. The tepid bath, or affusion, is frequently more appropriate in the early and acute stages of inflammation than the cold on the one hand, or warm, vapour, or medicated baths, on the other; as it gradually reduces the temperature without favouring the occurrence of reaction. Warm, vapour, and medicated baths are most serviceable at advanced periods of inflammation, after evacuations have been freely procured, or when the disease becomes chronic or complicated.

217. *The abstraction of all causes of irritation*, as well as of the exciting causes of the disease, is obviously requisite in the treatment of inflammation. The excitement of the senses, especially of the organs of sight and hearing, and of the mental faculties, should be carefully guarded against. Muscular action, and stimulation of the stomach by heating food and beverages, ought also to be prevented; the antiphlogistic regimen being strictly enforced in all its parts.

218. λ. *Derivatives and counter-irritants.*—These should never be employed until the general vascular excitement is subdued by bloodletting and other evacuations; and until a powerful impression has been made upon the local affection. These ends being attained, the *mode* of derivation or counter-irritation should next be considered. This should depend upon the seat, form, and duration of the inflammation, and the consequences to which it may already have given rise. — In acute cases, and at early stages of the disease, the *hot turpentine epithem*, or application, already described (§ 201.), is the most efficacious, the safest, and the most immediate in its effects. It should always be applied over the inflamed organ, or as near it as possible. It is applicable to all forms of inflammation, in whatever organ they may be seated. It tends, more than any other derivative, to determine the circulation to the cutaneous surface, and to prevent the more dangerous consequences of the disease.

219. *Sinapisms* are extremely serviceable, and produce their effects rapidly, but they are less efficacious than the turpentine epithem. — The application of the strong *solution of ammonia*, with tincture of camphor and spirit of rosemary, as advised by Dr. Granville, is also of use, and especially in weak, irritable, or nervous persons, and when inflammatory irritation is attended by much pain. It produces a very rapid effect, and either a superficial and slight, or a more severe and caustic, action, according to the duration of the application. — The liniment employed as a counter-irritant by the notorious empiric, St. John Long, was recently analysed by Dr. Macreight, who found it to consist of oil of turpentine and acetic acid, held in suspension by yolk of egg. Having prepared a liniment consisting of *one ounce and a half of oil of turpentine, of one ounce of strong acetic acid, three ounces of water, and the yolk of one egg*, the three last being rubbed together, and the first being afterwards added, Dr. Macreight found it, in its sensible properties and effects, to be identical with the empirical medicine. That a liniment consisting of these ingredients should prove of essential service in many cases, cannot be doubted. For upwards of twenty years, and for several years before this fashionable empiric appeared, I had frequent recourse to a liniment, consisting of equal parts of the compound camphor liniment and the compound turpentine liniment, with a little cajuput oil, as a counter-irritant; varying it, however, according to the peculiarities of the case, and as prescribed in various parts of this work, and in the Appendix (see F. 296. 311.). When this liniment, or any of the others just referred to, is applied on the surface of

warm flannel, or of a cloth wrung out of hot water, over the situation of internal or deep-seated inflammations, it produces an almost immediate effect. But friction during ten or fifteen minutes with the cold liniment will give rise to erubescence, sometimes to exudation, and more or less decided relief. In acute cases, the former mode of application may be adopted; but in chronic or sub-acute inflammation, particularly when alteration of structure has taken place, repeated frictions with this liniment, short of inflaming the skin, are often to be preferred. When the irritation produced by it gives rise to vesication or abrasion of the cuticle, the parts soon heal; but it is frequently of service to continue this effect for some time, by the repeated or prolonged use of the application.

220. *Blisters* may be employed as counter-irritants in three modes: — 1st, as rubefacients; — 2d, as simple and slight irritants; — and, 3d, to procure a puriform secretion from the part. In acute inflammations they ought not to be prescribed until bloodletting has been carried as far as circumstances will permit; and in early periods of the disease, they should not be applied longer than seven or eight hours, and a warm bread and water poultice should be placed over the part, to promote the vesication, and to prevent the irritation sometimes consequent on them. It will occasionally be advisable to place tissue paper between the blister and the surface. On *children*, blisters ought not to be applied longer than from three to six hours, and warm poultices should generally replace them, and be renewed frequently. For sub-acute and chronic inflammations, or for the advanced stages of the acute, blisters may be prescribed for a longer period, and sometimes with the intention of procuring a sero-puriform discharge from the blistered surface.

221. *Warm pediluvia*, the *hip-bath*, and the *semicupium*, are often useful modes of derivation, when the head or the thoracic viscera are affected, or when it is desirable to excite the uterine discharge. Their effect will generally be promoted by the addition of mustard and of common salt to the water. But, in acute inflammations, the temperature should not be too high, or such as may heighten the general vascular action. They also ought not to be resorted to until depletion and alvine evacuations have been duly practised. Besides these, there are other substances sometimes used to produce counter-irritation and derivation, as *croton oil*, the powder or tincture of *capsicum*, bruised *garlic*, and scraped *horseradish*. They quickly produce a rubefacient action when applied on the skin; but are not so efficient in the severer cases of acute inflammation, as those previously noticed. They are all, however, often of service, particularly in the slighter forms of the disease, that are attended by acute pain. Besides these, *cupping* with scarification, and *dry-cupping*, are serviceable modes of derivation in the sthenic forms of phlegmasia.

222. The foregoing modes of counter-irritation are most serviceable in recent, acute, or sub-acute inflammations. Those which are about to be noticed, act chiefly as suppurants, and are most suited to the chronic states, or to the more advanced stages, or rather to certain of the consequences, of the acute and sub-acute forms of inflammation. They consist chiefly of ointments or plasters containing the *potassio-tartrate of antimony*, or *cantharides*, or *savine*; the decorticated *bark* of the *mezereon root*, moistened in water or vinegar, and applied to a small portion of the cutaneous surface; *croton oil*, either alone, or suspended in twice the quantity of camphor or soap liniment or olive oil; *issues* and *setons* of various forms and kinds; *moxas*, and the *actual* and potential *cauteries*. The exact circumstances requiring either of these means in preference to others are so numerous, — the choice of them depending so entirely upon the seat, peculiarities, and stages of the disease, upon the constitution and diathesis of the patient, and upon the other remedies employed, — that no general rules can be stated for the guidance of the inexperienced in this respect; the powers of observation, experience, and views of the practitioner must be his chief guide in the adoption of these, as well as of many other means of cure.

223. It has been very justly remarked by my early friend and former colleague, Dr. DUNGLISON, in his very judicious observations upon the use of revellents in the phlegmasiæ (see his excellent work, entitled, *General Therapeutics, or Principles of Medical Practice, &c.* 8vo. Philadelph. 1836, p. 363.), that when we are desirous of maintaining a succession of revulsions, or a constant revulsion, we employ either repeated blisters, or keep the blistered surface discharging by applying some of the other means just mentioned. Tartarised antimonial ointment is well adapted for chronic inflammations, as of the lungs, — because, whilst the pustules induced in any one part of the exterior of the thorax, or elsewhere, are going through the stages of increment and maturation, a fresh crop may be elicited on some other part of the chest; and thus a succession of irritations can be developed, which is more beneficial than one that is more permanent.

224. It is of importance to determine the *extent of surface* to be affected by a revulsive application. This is not always so easy a matter as may be supposed; for, if the vital conditions be affected by it in a very limited extent of surface, the morbid action, intended to be remedied, may be entirely uninfluenced by it: and, on the other hand, if a very large surface be irritated, constitutional disturbance will be thereby excited; or that depending upon the primary disorder, as well as the disorder itself, will be aggravated or perpetuated. — As to the *time*, during which the counter-irritation should be maintained, but little can be stated; for it must depend almost entirely upon the circumstances of the case. On this topic, Dr. DUNGLISON remarks, that it is chiefly when the diseased action has been prolonged for a considerable period, and in affections of a neuralgic kind, that sudden and violent revulsions are productive of the most marked advantage. In the different phlegmasiæ, revulsions which implicate a greater extent of surface, and are more prolonged in their action, are decidedly preferable. In the former cases, moxas and the cauteries may be employed; in the latter, rubefacients and vesicants.

225. The permanence or remittence of the counter-irritation deserves consideration in every case for which this means is prescribed. In most of the phlegmasiæ, remittent revulsion is more serviceable than a prolonged or permanent revulsion. Dr. DUNGLISON justly observes, that when an artificial irritation, accompanied or unaccompanied with increased secretion from the part, has been

established for some time, it ceases, in a great measure, to be a morbid condition, and cannot be arrested without an inconvenience, or risk to some organ predisposed to disease; but if a succession of irritations be produced, the system never becomes habituated to them, and the repetition of the irritation, after a short period, is as beneficial as at first. A succession of vesicants, therefore, is to be preferred to a more permanent application; setons and issues losing much of their beneficial influence in the latter periods of their employment.

226. Broussais, and many of his followers, have contended that revulsive irritations should be stronger than the morbid action they are intended to replace, otherwise they tend to increase the latter; but although it is manifestly necessary to reduce the inflammation as much as possible by depletions, before counter-irritants are prescribed, yet great good will result from the judicious use of them. There are also several that may be very safely employed early in some of the phlegmasiæ, and even before depletions have been practised, as the turpentine epithem, liniments, &c. (§ 201. 219.). I therefore agree with Dr. Dunglison, in believing that good will be derived from revulsants in appropriate cases, even should they fall short of the precise degree necessary for completely putting an end to the disease for which they were prescribed.

227. The *situation* to which revulsants or counter-irritants should be applied, relatively to the seat of inflammation, is deserving of attention, especially as a contrariety of opinion exists on the subject. And yet the very terms here used ought to guide the practitioner to the application of them to parts which are not supplied with branches of the same nerves and blood-vessels as proceed to the seat of disease. Much, however, should depend upon the nature of the adopted revulsant; for the turpentine epithem or embrocation will never be injurious, but generally beneficial, however close it may be applied to the inflamed organ. But it is different with blisters and other counter-irritants. I cannot agree with Dr. Thomson's and Dr. Chapman's recommendation to place these "as near as possible to the affected part." I have often seen mischief result from the early application of a blister to the scalp in meningitis and encephalitis, and to the throat in laryngitis and tracheitis. When, however, the inflammation is of an asthenic or adynamic kind, or when the sthenic form has given rise to effusion, blisters, as well as several other counter-irritants, may generally be applied close to the diseased organ. Yet, even in these circumstances, exceptions to the rule are not few. The choice of situation must therefore depend upon the seat and character of the phlegmasia, and other peculiarities of the case: precise directions respecting it can be given only when discussing the treatment of particular inflammations. In all cases the choice should be guided, as M. Begin remarks, by sound physiological principles; for they only can render this mode of practice more certain than it has hitherto been, and prevent the inconveniences which often follow it.

228. It has been already stated that blood-letting, both general and local, may be so instituted in several of the phlegmasiæ, as to derive from the seat of disease. The older writers paid much attention to this method of depleting. Bleeding from the saphena vein, the feet and legs being immersed in warm water, was often prescribed for phlegmasiæ of the viscera, and particularly when consequent upon suppressed evacuations: and bleeding from the vicinity of the anus by leeches is generally adopted by foreign physicians, for inflammations of the liver, stomach, &c. Indeed, to derive the impetus of the circulation from the seat of the phlegmasia by vascular depletion, by cathartics or other evacuations, and by counter-irritants or other revellents, both internal and external, must always be a principal indication of cure, in this class of diseases.

229. *μ. Of applications to the inflamed part itself*, there are some that require a particular notice. They may be all comprised and considered under the following modes of operation: — 1st, Those which reduce the temperature, and thereby remove one cause of morbid irritation, and of vascular expansion; — 2d, Those which soothe the morbid sensibility or diminish pain, either by their influence upon the affected nerves, or by diminishing the tension, rigidity, or pressure of parts; — 3d, Those which constringe the expanded capillaries, restore their lost tone, and prevent the stagnation of the blood or promote the circulation in them; — and 4th, Those which protect the part from external irritants, &c. It is obvious that many local applications produce benefit by acting in more than one of these modes; but still they may be referred to one or other of these especially. Moreover, many internal means of cure act upon the part affected, particularly in visceral phlegmasia, in one or other of these ways. As *topical means* are applicable chiefly to external inflammations, which are generally viewed as belonging to the province of the surgeon, my remarks respecting them will be as brief as the importance of the subject will permit. Yet it must not be overlooked, that most external inflammations, particularly when spontaneous, are merely symptomatic of constitutional disorder — are only the external manifestations of visceral or general disturbance, or of hereditary vice, — that they all react upon the frame through the medium of the organic nervous and vascular systems, — and consequently, that, whilst local remedies form only a part of the treatment required, the rest being employed with reference to the internal and constitutional affections, the entire treatment, even in the external phlegmasiæ, is more strictly medical than surgical, if, indeed, the distinction should be at all entertained.

230. (*a*) *Of those applications which directly reduce the temperature*, some notice has already been taken (§ 214.). They have generally the effect, not only of removing a principal cause of excitement and irritation, but also of constricting the morbidly expanded vessels. *Cold applications* are, however, often injurious, and consequently inappropriate or hazardous, whenever the external inflammation is merely the outward expression of internal or constitutional disorder, as in gout and erysipelas: they are less so, however, in sthenic than in asthenic or specific inflammations. For in the sthenic phlegmasiæ, the vital energies are capable of resisting their sedative influence, and the suppression of the local affection rarely endangers internal viscera. But in the other kinds of inflammation the repulsion of the external affection often caused by these applications is frequently followed by serious internal disease. In such cases the source of mischief is in the frame,

and in some important or vital organ; and when the effects are prevented from appearing externally, they often break out in some internal viscus.

231. Of the numerous *cold applications*, there are few which are preferable to the *solution of the di-acetate of lead*, inasmuch as it combines astringent with cooling and sedative properties. But this, as well as the common *cooling* or *evaporating lotions*, and *cold or tepid water-dressings*, should be suited to the intensity of the inflammations, and be used unremittingly, until the local affection is subdued; for if employed only at intervals, or if at all intermitted, reaction will take place in the inflamed part, and the disease will be thereby aggravated, or at least perpetuated. We observe this in the treatment of *scalds* by cold applications, when used in this latter mode. When the inflammation is of a specific or asthenic kind, and when it is attended by great tumefaction and excessive pain, or when cold applications do not give relief to the pain in a short time, they ought either not to be employed at all, or not to be continued, but give place to very different means. Also when they produce general chilliness, they ought not to be persisted in.

232. (*b*) *Applications which soothe the morbid sensibility* are perhaps more generally appropriate, and are certainly less dangerous in the symptomatic or specific phlegmasiæ just alluded to, than those which are cold. They all more or less diminish the tension of rigid and unyielding tissues, lessen pressure on sensitive parts, and have an emollient and soothing effect. *Moist warmth*, employed in various ways, but especially in the form of *steam, simple and medicated*, and of *fomentations, poultices*, and *warm baths*, also either simple or medicated, &c., is the principal agent by which the physician or surgeon produces these effects. *Steam*, or warm aqueous vapour, has lately come into notice in the treatment of inflammations; and we are indebted to Dr. Macartney and Dr. Wilson for a knowledge of its virtues in respect of its topical external use; for as regards its internal employment by *inhalation* in affections of the respiratory organs, it has been long prescribed. (See Asthma, and Bronchi — *Inflammations of*.) In the form of the vapour bath, it has also been generally used, particularly in circumstances already noticed (§ 204.). By very simple yet suitable appliances, *steam*, either of water alone, or of water containing various *narcotic* or *emollient herbs* or *extracts*, or *camphor*, or *acetous* or *terebinthinate substances*, may be brought in contact with, or entirely surround, the seat of inflammation. It may likewise be *inhaled* into the lungs for the affections referred to, either in its simple or medicated states. When employed externally, and particularly to a limited extent of surface, it should be continued for a very considerable time, and at a somewhat higher temperature than when inhaled. The substances, also, whose fumes are conveyed in the vapour or steam, may be used in much greater quantity when applied thus externally and locally, than when prescribed internally. *Fomentations* and *poultices* containing emollient, narcotic, or other medicines, are also efficacious, not merely by the moist warmth they afford, but in great measure by the impression made upon the nervous tissue by the particular medicinal substances they contain. The same remarks apply to medicated warm baths.

233. It is principally for inflammations attended by excessive pain, by much constitutional irritability, by a very frequent and irritable pulse, and depressed vital powers, that the warm and soothing applications now mentioned are required. Hence they are generally appropriate in the specific and asthenic inflammations: and in them especially afford very great relief, particularly when brought in aid of judicious internal treatment and suitable regimen, and employed early in the disease.

234. (*c*) Applications which constringe the expanded capillaries, restore their lost tone, and prevent the stagnation of the blood, or promote the circulation in them, are suitable to certain states of the advanced stages, and to some of the consequences, of sthenic inflammation. They are also appropriate to most of the specific and asthenic phlegmasiæ from their commencement. When the former proceeds to ulceration, and especially if this assume a spreading or phagedenic form, the more energetic astringents, as the various *turpentines* and *balsams*; certain *metallic salts*, particularly solutions of the sulphates of zinc, of copper, iron, &c., of the nitrate of silver, and of the acetates of lead, zinc, &c.; the dilute *mineral acids*; solutions of the *chlorinated soda*, of the *chloride of lime*, and of the *chlorate of potash*; various *vegetable astringents* and *tonics*; *creasote*, *camphor*, the *vegetable acids*, &c.; are severally beneficial in such circumstances, when suitably prescribed and combined with other appropriate means — in some instances with narcotics, and in others with mucilaginous or albuminous substances, — occasionally in aqueous vehicles, and sometimes in unguents, cerates, &c. It is chiefly, however, when the states or consequences of inflammation just noticed are external or near the surface, or within reach, that applications containing any of these are found useful; yet even when seated in internal surfaces, as in the intestinal and respiratory, they are occasionally beneficial, employed either in the form of draught, pill, and enema, or by means of the inhalation of aqueous vapour partially charged with the fumes of some of them. Although it is chiefly for the advanced stages or consequences of asthenic inflammations that astringent substances are required, yet the early and acute stages are also sometimes benefited by them, however stimulating or irritating they may seem to be. Thus, in scalds, and in certain states of burns, the application of a cloth wetted with spirits of turpentine will generally not merely afford relief, but hasten resolution of the inflammatory action. In such cases it may be truly said with Shakspeare that,

> "One fire burns out another's burning."

235. (*d*) Substances which protect the inflamed surface from the irritating influence of the air, and of the exhalations floating in it, are extremely beneficial in all cases in which the part is abraded or its continuity injured. They are, however, less useful when they prevent the morbid secretion of the inflamed part from being discharged. In most cases, therefore, they should be so employed as to prevent any accumulation of this secretion from taking place, whereby the surrounding tissues might be contaminated. Most of these substances are advantageously made the vehicles of astringent or detergent medicines, thereby diminishing the discharge by constringing the extreme vessels, as well as excluding a chief cause of irritation, and of

the consequent morbid secretion. The principal advantage derived from plasters, cerates, ointments, &c., is owing to the exclusion of the air by them from the abraded or divided surface. In many cases of injury, the fibrinous lymph exuded from the extreme vessels, by coagulating over them, protects them from irritation; and were this natural protection more frequently allowed to remain, and confided in, inflammation would less frequently supervene on these cases, than it otherwise does. The albuminous exudations, formed on superficial ulcerations and inflammations of exposed surfaces, protect them in a similar manner, and dispose them more readily to heal; and if the inflammatory action should at any time be exasperated, so as to give rise to an increase of the morbid secretion or to the production of pus, underneath the protection thus formed, the mischief will often soon subside, and the secretion become absorbed, the parts healing under the scabs, or dried lymph or albumen, covering them. Superficial sores, when protected by the *white of egg*, often heal underneath; and dressings with this substance, by entirely excluding the air, are often more serviceable, in preventing inflammation after incised wounds, and in promoting union, than any other. Strong solutions of the *nitrate of silver*, or of *sulphate of copper*, or *sulphate of zinc*, or other *astringents*, applied to ulcerating surfaces, not only excite the organic nervous tissue, and constringe and give tone to the exhausted extreme vessels; but they likewise coagulate the albuminous portion of the secretion, and thereby protect the part against the iritating influence of the air. They also change the morbid secretion, causing it to assume a more healthy character. Substances which either simply protect a raw inflamed surface, or act in the more complex manner just mentioned, are especially serviceable in cases exposed to the influence of impure air, whether the impurity proceeds from terrestrial exhalations, or from animal emanations, as in the wards of an hospital, or in close, low, or crowded habitations.

236. ii. Treatment of Asthenic Inflammation.— When phlegmasia presents the asthenic form, the treatment should be very different from that recommended above. The states of organic nervous power and of vascular action differ from those attending the sthenic conditions; and as the differences are great, so should the indications of cure, and the means employed to accomplish them, be different. As all the modifications of asthenia depend chiefly upon two classes of circumstances, — upon depressed conditions of the constitution, and weakened functions of the viscera concerned in assimilation and excretion, and upon the sedative, poisonous, or septic nature of the exciting causes, — so all the indications of cure ought to be determined, and the remedies selected, with strict reference to these circumstances. If the local phlegmasia is associated with, or consequent upon, general asthenia or debility, vital power must be augmented by suitable means; otherwise the local disease will more readily terminate unfavourably, especially if it exist in much intensity. If, in addition to general or constitutional adynamia or asthenia, there be impaired excretion, and consequently accumulation of effete elements in the blood, or deterioration of it, not only must vital energy be supported or roused, but also the excreting or eliminating functions must be excited, and means employed which may correct or change the morbid tendency or conditions of the blood; for if these ends are not attained, the structural lesions which the inflammation rapidly induces, instead of being arrested, or terminating in spontaneous resolution, would be rapidly accelerated, and themselves become the source of further local disorganisation, and of constitutional contamination.

237. Asthenic inflammations, whether depending upon original, acquired, or accidental states of the frame, and of the vital organs, or proceeding from specific causes, require a treatment directed more strictly to the conditions of vital power and function — to the constitutional affection and the existing visceral disorder — than to the local disease; and they moreover require this kind of treatment much more than the forms of phlegmasia already considered. In the latter, the constitution and the vital organs have generally been either unimpaired or not materially affected, before the local disease originated and drew them within the circle of its sympathies; in the former, either the constitution, or some important viscus, or both, have been seriously deranged before the inflammation appeared, — this latter being either the consequence of, or an accidental contingency upon, such derangement, and depending upon it in its subsidence, as well as in its appearance. Even when the asthenic forms of inflammation more especially proceed from specific or septic causes, still very much of their local characters and of their constitutional effects depend upon pre-existing states of vital energy and of the assimilating and excreting functions. To these, in their antecedent, as well as in their existing conditions, the attention of both physician and surgeon ought to be mainly directed; and neither the one nor the other will discharge his duties, if he does not connect the forms and changes of the local affection with the constitutional disorder and the visceral derangements, and treat each of them with strict reference to the rest.

238. Although *indications of cure* should not be followed in succession, nor acted upon individually, and without regard to their joint operation, — although attempts at accomplishing one intention, without endeavouring to attain others at the same time, should not be made in asthenic, any more than in sthenic, inflammations, — yet it will be necessary to have just ideas, as to the principal objects to be attained, in order to arrive at a successful issue; and as to the importance and applicability of them severally in the treatment of each particular case. These *objects* or *intentions* should be entirely based upon the characters assumed by the constitutional commotion, by the visceral disorder, and by the inflammation, — the seat and cause of the phlegmasia, and the circumstances immediately connected with the patient, being also taken into account. Upon these, the activity with which each indication of cure should be pursued, and the importance assigned to one or more of them, should chiefly depend. Influenced by these considerations, and by the phenomena and progress of asthenic phlegmasiæ, the physician, in their treatment, will propose to himself — 1st, To promote organic nervous power, and thereby to enable the constitution to resist the progress of the local disease; — 2dly, To preserve

or to restore the healthy state of the circulating fluids, and the crasis of the blood, by promoting the excreting or depurating functions, and by other appropriate means;—and, 3dly, To assuage the urgent symptoms referrible either to the local malady or to the constitutional affection. The means which most efficiently fulfil the *first* of these intentions, will generally also promote the attainment of the second and third; and whatever has the effect of accomplishing the *second*, will also most materially advance the other indications.

239. *A. The constitution will generally be enabled to resist the local progress of the malady*, by whatever increases the tone or energy of the organic nervous system, through the medium either of the digestive canal, or of the respiratory organs, — by means of appropriate tonics and stimulants, and by a dry, pure, and temperate air, duly renewed. All asthenic inflammations have a tendency to spread or to extend themselves with a greater or less rapidity, and to terminate unfavourably,—the changes that successively arise, tending to gradual disorganisation, or to more immediate sphacelation. Unless under the influence of agents which rally the constitutional powers, they seldom or never show a disposition to spontaneous resolution, as often observed in sthenic phlegmasia. The only exceptions to this rule are met with in those asthenic inflammations which constitute a part of specific constitutional maladies; and these are mere symptoms, or parts only, of these maladies, and are generally co-ordinate with and dependent upon them, in their rise, progress, and decline. This tendency to spread, and to give rise to a succession of unfavourable changes, constitutional as well as local, requires agents possessing powers of sufficient activity to meet the intensity of the disease. As this tendency depends upon depressed organic nervous energy, and deficient vascular tone, as shown above (§ 58.); and as the permanent fluidity of the effused fluids, and their infiltration, and contamination, of the surrounding tissues, depend upon these pathological states; it is obviously requisite to employ such means, as attentive observation and enlightened experience have proved to be most efficient in removing them. All parts which are the seat of asthenic inflammation rapidly lose their vital cohesion or tone; and this loss is participated in, not only by the extreme vessels, giving rise to a copious morbid effusion, but also by the tissues affected. The chief pathological conditions, from which all the consecutive changes have been shown to proceed (§ 162. *et seq.*), manifestly require an energetic recourse to those means which will enable the constitution to resist the progress of the local mischief. Where cellular or adipose tissues are implicated, the extension of disease, and even of disorganisation, will be rapid, if organic nervous energy be not promoted, and if vascular action in the seat of inflammation be not changed, by suitable remedies. In such cases, the constitution must be enabled, as John Hunter ably contended, to form coagulable lymph, either in, or around, the inflamed part, — or, in other words, to change the fluid and often septic matter effused in the areolæ of the tissues, that extends the mischief by infiltrating and contaminating them, into coagulable lymph or albumen, whereby these areolæ may be rendered impervious to the more fluid part of the effused matter, and the progress of the local malady may be more readily limited.

240. The *principle* of treatment in asthenic inflammations being established, the *means* by which it may be most successfully carried out in practice will be readily found; although the application of these means, appropriately to the varying phases of individual cases, requires great discrimination and care. In the truly asthenic forms of phlegmasia, the principle contended for must be acted upon with decision, and without wavering or temporising. In the treatment of them, doubt or hesitation is fraught with danger; and proceeding, as either generally does, from ignorance of the true source and relations of the local malady, there will be every reason to fear that much of both positive and negative wrong will be further perpetrated. The ignorant are usually presuming; and the half informed, self-sufficient. In other professions and avocations, the evils produced by both are comparatively trivial; but, in the practice of medicine, their consequences are of fearful and immeasurable importance to humanity. I have seen numerous cases of asthenic inflammation die in succession, without the occurrence of a single instance of success to lull the suspicion that true principles of practice had not been adopted; and yet the same principles were blindly pursued in each successive case. In a country where the most trivial invasion of the rights of property is visited by the most condign punishment, human life may be sacrificed to an extent that more than rivals both the pestilence and the sword, by ignorant pretenders to medical knowledge — by the totally uneducated as well as by the half instructed,—and not merely with perfect immunity from punishment, but actually with the protection of the government, that protection being virtually the most complete for those whose ignorance is the greatest! This sacrifice of human life, be it further recollected, is constant and unceasing — not occasional only, or at long intervals, as that caused by epidemics, pestilences, and wars.—It was said, upwards of two hundred years ago, by a celebrated Archæologist (Sir H. Spelman), "that whilst every thing else had risen in nominal value in England, the life of man had become continually cheaper." What would he have said, had he lived in the present day?

241. The *means*, by which the indication or practical principle above contended for is to be fulfilled, must necessarily vary with the circumstances of the case; but the decoction of *cinchona*, or the infusions of *cascarilla* and of *gentian*, &c. with the *alkaline carbonates* (F. 381. 385. 387, 388. 445. 869.), are generally beneficial, especially when aided by warm aromatic tinctures or spirits. When the pulse is very quick, soft, and weak, and when the patient is physically and morally depressed, the *chlorate of potash*, *serpentaria*, or other stimulants, may be added to the above (F. 415—417. 437—439.). In these cases, *camphor* in full doses, the preparations of *ammonia*, and *capsicum*, or other spices and aromatics (F. 845. 852.), may likewise be prescribed. In all asthenic inflammations, the excretions, and the fluid effused in the diseased tissues, are more or less acid,—a state which is most readily corrected by the alkaline carbonates, conjoined with tonics and aperients. In many cases,

however, the preparations of *chlorine*, particularly the *hydrochloric acid*, the *hydrochloric æther*, and *chlorinated soda*, prescribed with tonic vegetable infusions or decoctions, and with camphor, aromatics, &c., are equally beneficial with the foregoing (F. 847, 848.).

242. *B.* But, in order to promote the powers of life, and thereby to enable the vessels of the diseased part to form coagulable lymph, whereby the progress of mischief may be arrested, it is necessary, not only to excite the organic nervous system, but also *to depurate and to correct the circulating fluids by appropriate medicines.* This intention will be fulfilled chiefly by promoting the excreting functions by mild *purgatives*, conjoined with *tonics* and *aromatics*, as the compound *infusions of gentian and senna* with the alkaline salts (F. 266.), the compound *decoction of aloes* with warm aromatic tinctures or spirits, or the infusions of *rhubarb* and *cinchona* (F. 55. 387. 433.), or other similar remedies (F. 53. 215, 216. 872.). In the intervals between the exhibition of these, tonics and stimulants should be selected, and given in doses and combinations suitably to the seat and urgency of the disease. If the purgatives just mentioned act insufficiently, a dose of oil of turpentine and castor oil (about half an ounce of each) may be taken on the surface of milk, or of any aromatic water (F. 216.), and enemata containing the same oils (F. 135. 151.) administered according to circumstances. If the biliary secretion be suppressed or interrupted, *calomel* or PLUMMER's pill may be given at bed-time, with *camphor*; and a draught containing the oils, or either of the above purgatives, may be taken in the morning. The combination of the mild alkaline salts, or of the chlorate and carbonate of soda (F. 439.), with the foregoing tonic or other medicines, will generally correct the circulating fluids, diminish the contaminating influence of the matter effused in the seat of disease, and further promote the fulfilment of the present indication.

243. *C.* From the commencement of the treatment, it is often requisite *to mitigate the more urgent local and constitutional symptoms.* — *a.* The remarkable pain and tumefaction of the inflamed part are best relieved by anodyne fomentations, by warm bread and water poultices, or by the local application of simple or medicated steam. In the more complete forms of asthenic inflammation, no advantage will accrue from the application of leeches to the inflamed part; although a recourse to incisions of the integuments, as recommended by Mr. A. COPLAND HUTCHISON, and others, will often be of service, when cellular and adipose parts are the seat of disease, and the tension is very great. I have seen also the application of a cloth moistened with oil of turpentine have a very remarkable effect both in mitigating the pain, and in lessening the tension and tumefaction. It should be applied warm, and covered with wash-leather or oil-skin to prevent evaporation and cold. In several cases, where the swelling has been most extensive, — the whole limb to the trunk having been affected, — I have seen it subside very quickly after a decided recourse to the internal and external treatment here recommended. In most of these cases, the tone of the vessels has been rapidly restored, congestion of them removed, and the effused fluid absorbed, without coagulable lymph having been formed, or suppuration having supervened, excepting in some instances at the point of injury, or where the disease originated. When this treatment is early resorted to, not only is the progress of the disease arrested, but also much of its more immediate effects is removed, without the lesser evil, the formation of fibrinous lymph, for which JOHN HUNTER contended, having taken place.

244. *b.* At advanced stages of asthenic phlegmasia, more frequently, and even at early periods occasionally, excessive *pain* and general *irritability* call for a prudent yet decided recourse to *narcotics.* In these cases, a lowering treatment will neither mitigate the pain nor diminish the other symptoms, but, on the contrary, increase them all, and render still more rapid the already quick and irritable pulse. Here *opium*, or the acetate or hydrochlorate of *morphia*, or *hyoscyamus*, in large doses, must be resorted to. But these ought always to be conjoined with *camphor* and some of the *aromatics* or *spices.* — When *delirium* appears in the course of asthenic inflammation, depressing remedies are generally injurious; but the narcotics just named, and combined as now advised, will be of the greatest benefit, particularly in conjunction with the restorative treatment above recommended, and after the excretions have been duly evacuated by appropriate means. — (See art. DELIRIUM.)

245. *c.* When asthenic inflammations are attended by general *vital depression without re-action* (§ 62.), the most energetic stimulants, tonics, and restoratives are necessary; and if delirium supervene, camphor, ammonia and opium, with warm aromatics, should be freely exhibited.

246. *d.* When organic nervous or *vital power is depressed, although much general vascular excitement exists* (§ 63.), the pulse being rapid and weak, similar means to the above are requisite, but in less energetic doses. Camphor, with the narcotics already advised and aromatic spices, mild stomachic purgatives, occasionally aided by a draught and an enema containing turpentine and castor oils, are also most efficient remedies.

247. *e.* In cases characterised by *depressed vital power, acute nervous sensibility, and cerebral disorder* (§ 64.), the means just recommended are urgently called for; but the narcotics and camphor should be prescribed at an early period of the disease, and in large doses. The effusion of tepid or warm water on the head, according to the temperature of the part, may be employed. Medicated vapour or warm baths may also be tried, and medicated steam (§ 232.) may likewise be applied to the local malady.

248. *f.* When there are *excessive irritability, acute pain, and vascular excitement* (§ 65.), the internal and external treatment just prescribed, but modified according to the stage and particular features of the disease; a combination of camphor calomel, and opium; stomachic aperients, with the alkaline salts, and an occasional recourse to turpentine and castor oil, in the form of draught or enema; are chiefly to be relied upon.

249. *g.* Great *irritability of stomach* may occur at an earlier or later period of asthenic inflammations, when attended by any of the forms of constitutional commotion just referred to. When this is the case, every endeavour must be used to allay it. Warm aromatics, or spices and stimulants, with small doses of opium, will generally have this effect in the less urgent cases; par-

ticularly when aided by the assiduous application of the warm turpentine epithem over the region of the stomach, and by the administration of stimulant and antispasmodic enemata. In such circumstances, those articles which are most grateful to the stomach should be selected, and every thing of a depressing nature avoided. Effervescing medicines are seldom useful, especially if this very unfavourable symptom occur at an advanced period of the disease. More advantage will accrue from small and frequent doses of ammonia, camphor, capsicum, and other warm aromatics or stimulants, — from small quantities of burnt brandy, — from strong and highly spiced negus, — and from other restoratives of small bulk, — than from cold relaxing fluids. I have seen much benefit derived in these cases from moderate doses of créasote, or of cajuput oil, in suitable vehicles, or in the form of pills made with any absorbent substance.

250. *h.* When disorganisation of the inflamed part has commenced, or is advanced, *local means* of an energetic kind may be prescribed if they can reach the part in any way; if they cannot, the constitutional treatment, aided by suitable diet and regimen (§ 260.), and by a pure, dry air, must be energetically but carefully enforced. As to the topical applications which may be prescribed in these circumstances, some incidental observations have been already offered; but it may be further stated, that those substances which *constringe* or *impart tone* to the affected vessels and tissues should be employed, and that those which possess this as well as an *antiseptic property* in the most marked degree, should be preferred. Strong decoctions or infusions of cinchona, or oak barks, the terebinthinates, the solution of chlorinated soda, or of the chlorate of potash, or of the chloride of lime, or créasote, may be severally employed in the form of either lotion or injection, or on the surface of warm poultices, or in any other mode more appropriate to the peculiarities of the case.

251. *i.* During the treatment, especially of the advanced stages of asthenic phlegmasia, the *absorption of the morbid matter* from the seat of disease, into the circulating fluids, ought to be prevented by every possible means. This object can be obtained only by giving a free exit to whatever of this matter may have accumulated, and by preventing any collection of it from taking place. The internal treatment, which I have advised, will also have a most decided influence in preventing the absorption of it, and will enable the powers of life to resist whatever morbid impressions it may make in the seat of disease. The marked influences of all depressing agents in promoting the absorption of morbid fluids, and the powers of tonic and restorative means in preventing absorption, and the consequent contamination of the circulating fluids, as well as in enabling the constitution to resist the natural tendencies of these fluids and to throw them out of the œconomy, have been fully shown in the articles ABSORPTION (§ 15. *et seq.*), ABSCESS (§ 62.), BLOOD (§ 143. 157. *et seq.*), CELLULAR TISSUE (§ 35, 36.), and VEINS — *Inflammation of.* The constitutional and local treatment fully described when discussing *Typhoid* and *Putro-adynamic* FEVERS, *Diffusive Inflammation of the* CELLULAR TISSUE, and GANGRENE, is generally suitable to asthenic inflammations.

252. iii. TREATMENT OF INFLAMMATIONS INTERMEDIATE BETWEEN THE STHENIC AND ASTHENIC, &c. — Although inflammations generally present characters belonging more especially to the sthenic or asthenic forms, yet they occasionally present features appertaining to both, and consequently they require a somewhat different or modified treatment from what has been here assigned to each of the principal forms. Like all febrile diseases, inflammations also change their types and characters, under the influence of *climate, season,* and *epidemic constitution;* and hence, at particular periods, they not only present *sthenic* or *asthenic forms,* but also *transition,* or *intermediate, states.* Nor ought it to be forgotten, that these transition or intermediate states, as well as the more truly asthenic forms, are either so dependent upon, or associated with, certain conditions or affections of the constitution, — often of the organic nervous and circulating systems, — as to impart to the local malady many of its peculiar features. This is very manifestly shown in those inflammations which I have denominated *specific,* as arising from certain specific, or infectious, or poisonous causes, — in *erysipelas, puerperal inflammations, dysentery, small-pox, scarlatina, measles, syphilis,* &c.

253. *A.* Nor should it be overlooked, particularly in the treatment, that numerous morbid impressions made upon the œconomy, more especially by *epidemic constitution* and by *terrestrial exhalations,* modify remarkably all inflammations, and deflect them more or less from the sthenic type, to which I have sufficiently directed attention. These influences, therefore, however operating, must always be kept in view, in connection with other predisposing and exciting causes. The prevailing epidemic constitution is often sufficiently evident in its effects, however obscure in its origin and nature. The attentive observer will seldom fail of recognising it, even in its earlier appearances, particularly if the circumstances, to which I have already alluded (§ 191.), be observed.

254. *B.* The influence of *malaria* or of *terrestrial emanations* on inflammations is also important, although it is less observable in this country than in many others. In the southern countries of Europe, Asia, and America, and in many intertropical regions, malaria, by its effects upon the constitution, imparts to inflammation more or less of an asthenic or adynamic character, accelerating its course, or rendering its consequences most serious. In the less intense forms of inflammation, and particularly in their more chronic forms, the constitutional affection assumes either a *remittent* or *intermittent type.* In the former case, the influence of the paludal effluvia is often overlooked, or insufficiently estimated: in the latter, the local affection too frequently escapes detection, or is even never inquired after, the form of the attendant fever alone attracting notice.

255. *C.* In the *white races* of the species, and in the inhabitants especially of northern and temperate regions, the sthenic form of inflammation, and those states of the disease which more nearly approach it, most frequently occur. But in the *black* and *dark-skinned races,* inflammations either assume, or rapidly pass into, more or less asthenic forms. The mode of living is another circumstance which should be viewed in connection with the variety of species in which these diseases may occur, and which is of equal importance with it;

in the treatment of this class of maladies. Owing to the peculiarity of organisation possessed by the dark races, and to the forms which inflammations consequently assume in them, vascular depletions and other evacuations more readily exhaust the vital or constitutional powers, and are much less beneficial in the treatment of these diseases, than in the white races. Hence they should be most cautiously employed in these former varieties of the species, even although the phlegmasia may present, at its commencement, a predominance of the sthenic characters; and when it appears in an unequivocally asthenic form, means energetically tonic and restorative are especially requisite.

256. *D.* Much of this intolerance of depletions and lowering remedies, in the treatment of the inflammatory diseases of the dark races, may be attributed to their low or *abstemious diet*, and to their living chiefly on *farinaceous substances*. Although the constitution and modes of living of these races thus impart a certain character to many of their maladies, and especially to those under consideration, yet they also bestow upon them a much greater immunity from inflammations, than is possessed by the white and more highly fed variety of the species. Persons who live chiefly on animal food, and particularly on simply dressed or underdone meats, are much more liable to sthenic inflammations, and require much more copious depletions and alvine evacuations for their cure, than those who use vegetable food, or animal substances which have undergone great changes by elaborate or repeated cookery.

257. As these states of inflammation, which may be viewed as intermediate between positively sthenic and asthenic conditions, vary with these and other circumstances, so the treatment must necessarily be varied accordingly: but the several respects, in which variations should be made, cannot be stated with precision; they ought to be adopted conformably with the deductions, as to existing pathological conditions — local and constitutional — formed by the practitioner at the time of prescribing for them. Every thing must depend upon his pathological knowledge and acumen, and upon his practical resources, appropriately applied to each case.

258. *E.* The treatment of *specific inflammations* and associations of the phlegmasia with other maladies implicating the constitution or the principal viscera, especially those just named (§ 252.), requires no remark at this place. They present every intermediate feature between the sthenic and asthenic forms above described, according to the constitution and age of the patient, and to external or internal agents, existing epidemic constitution, and other circumstances by which his frame may have been, or is at the time, influenced; and they consequently require an application of the principles of practice, as well as appropriation of individual means, conformable thereto. But these topics will be found as fully discussed as the nature of the subject will permit, in the articles devoted to these *specific inflammations*, as well as in those on DYSENTERY, ERYSIPELAS, *the Complications of continued* FEVERS, &c.

259. iv. *The treatment applicable to* THE CONSEQUENCES *of the different forms of inflammation*, either has already been noticed in the foregoing observations, or has been fully considered in the separate articles devoted to the chief of these consequences, particularly ABSCESS, GANGRENE, INDURATION, SOFTENING, &c.

260. v. The DIET and REGIMEN ought to be strictly *antiphlogistic*, in the *sthenic forms* of phlegmasia. The *food* taken in the slighter and more chronic cases should be mild, farinaceous, and in small quantity. The *beverages* or *drink* ought also to be cooling and diluent (F. 588. *et seq.*). Perfect quietude of body and mind should be enforced, as tending most materially to keep down vascular action, to prevent the exhaustion of vital power, and to promote the operation of the medicines employed.

261. When inflammation assumes, or passes into, an *asthenic form*, it will be necessary to support the powers of life by a restorative diet and regimen, as well as by the medical treatment recommended (§ 236. *et seq.*). But in such cases, the digestive organs are always remarkably weak, are incapable of assimilating much food, and are readily disordered by whatever is difficult of digestion. The stomach should therefore be kept in humour, by allowing that only to be taken which is craved for or most relished. Generally, in the more asthenic cases, small quantities of warm or highly seasoned soups or broths, as beef-tea, gravy, or Mulligatawny soup, with boiled rice, &c., warm jellies, with old sherry, and similar articles, may be taken. If vital depression be great, warm and highly spiced negus, or mulled wines, and even champagne, may be freely allowed. In many instances, when there is much thirst, brisk bottled stout, seltzer-water with wine or milk, spruce or ginger beer, &c., may be given, and may even be made the vehicle of warm restorative medicines; but they ought not to be given until their temperature is raised somewhat above that of the surrounding air, nor should they be taken in too large a quantity at one time. In this form of inflammation especially, the patient should respire a mild, dry, and pure air. The varying phases of the disease — local and constitutional — ought to be carefully observed throughout; and whatever may occur of an unfavourable character, instantly met by energetic means.

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INFLUENZA.

— Syn. Epidemic Catarrh. *Influenza* (Influence), *Rheuma Epidemicum*, Sauvages. *Catarrhus Epidemicus*, Swediaur, Good. *Febris Catarrhalis Epidemica*, Huxham. *Synochus Catarrhalis*, *Morbus Catarrhalis*, Ehrmann. *Catarrhus a Contagio*, Cullen. *Febris Remittens Catarrhalis*, Macbride. *Defluxio Catarrhalis*, Young. *Catarrhe Pulmonaire*, Pinel. *Fièvre Catarrhale Epidémique*, *Grippe*, Fr. *Die Russische Krankheit*, *R. Katarrh*, *Influenz*, *Blitzkatarrh*, *Epidemischer Schnupfenfieber*, Germ. *Snufsjuka*, Swed. *Catarrho Russo*, Ital.

Classif. — 1. *Class*, Febrile Diseases; 5. *Order*, Fluxes (*Cullen*). 3. *Class*, Sanguineous Function; 2. *Order*, Inflammations (*Good*). III. Class, II. Order (*Author*, see *Preface*).

1. Defin. *Lassitude; pains in the head, loins, or limbs; chills, horripilations and coryza, followed by cough, by defluxions from the respiratory passages, by fever of a nervous or adynamic character and by anxiety at the præcordia, or pains about the margins of the ribs; the disease attacking a number of persons at the same time, and often passing into asthenic inflammation of the respiratory surfaces or organs.*

2. I. History.—*Influenza*, or *Epidemic Catarrhal Fever*, has been noticed by many medical writers since the revival of learning in Europe; and, although presenting on all occasions the same general features, yet it has assumed somewhat varied characters with the several circumstances connected with its appearances. The seasons, the weather preceding or during its visitations, the climate, and the locality, have, doubtless, slightly modified some of its phenomena; yet it has generally presented nearly similar features in very different seasons and situations. Indeed, whatever diversity may have existed in its several visitations, has been referrible rather to the epidemic itself than to other causes.

3. The earliest recorded occurrences of influenza were in the years 1239, in 1311, 1323, 1327, 1358, 1387, and 1403. Valesco of Tarentum was a witness of that of 1387; and he remarks respecting it, that scarcely one tenth of the population escaped the disease, the aged chiefly dying of it, and rheumatic affections often following it. The most successful means of cure consisted of pectoral decoctions and sudorifics. It appeared again in 1411, 1414, 1427, and 1438. Carli, the historian of Verona, describes this last to have been general throughout Italy, and fatal to the aged and to young children. Mezerey, the French historian, notices the prevalence of influenza in France, in 1482. Torrella, in his history of Italy, states that an epidemic catarrh prevailed throughout Italy and Spain in 1505, "qui paucis pepercit, senibus maxime, cum raucedine, gravedine, molestâ tussi, destillationibusque per superiora, comitante febri."—The historian De Thou mentions the appearance of a similar epidemic in 1510; and Sennert remarks respecting it — "in omnes ferè mundi regiones debacchata, cum febre, summâ capitis gravitate, cordis pulmonumque angustiâ atque tussi; quanquam multò plures attigit quàm jugulavit." (*De Abd. Caus. Rer.* lib. ii. cap. 12.) A similar epidemic pervaded Europe in 1557, and is described by Riverius, Schenck, and others. It presented the same symptoms as those observed in the recent visitations of the disease. Mercatus (*De Int. Morb. Cur.* lib. i. c. 43.) observes, that the Spanish physicians were greatly perplexed as to the treatment of this epidemic, for bloodletting and purging were of no service, but even injurious in many cases; and Valleriola (*Soc. Med. Comm. Append.* cap. ii.) states that it possessed the same characters in France — bleeding and purging being injurious, but demulcents and expectorants beneficial. The epidemic of 1578, described by Ballonius or Baillou, and which has been noticed by Ozanam and others as influenza, was evidently hooping-cough — inasmuch as it attacked children chiefly, and as the paroxysms of cough, which occurred at considerable intervals, were attended by vomiting of large quantities of a glairy fluid. That, however, which occurred two years later (in 1580), was certainly influenza. Mercatus describes not only the catarrhal symptoms, but also the pains in the head, back, limbs, and about the false ribs, usually attending this disease. He observes that bloodletting was often fatal — "Quo profectò, factum fuit, ut plures interficerent imprudentes et imperiti medici quàm mali sævitia et inclementia." Sennert (*Opera*, lib. iv. c. 17.) remarks of this epidemic, that, although generally prevalent in Europe, but few died of it, excepting those who were the subjects of old pectoral or visceral diseases, or who were improperly blooded. Similar observations are offered by Wier, Zacutus Lusitanus, Campana, Riverius, &c., who state that this epidemic prevailed over the whole globe, and in Europe, chiefly in April and May. Forestus prescribed a small bloodletting at the commencement of the disease, but confined this practice to the young, strong, and plethoric.

4. The epidemics of 1596, 1597, and 1617 offer nothing worthy of remark. That of 1627 was altogether the same as the one just noticed. The influenza of 1658 is fully described by Willis, as he observed it in London, in April, May, and June. Many aged, infirm, and delicate persons were cut off by it; pulmonary congestions, bronchitis, and pneumonia having manifestly,

from his description, been complicated with it. He treated it by moderate bloodletting, in the young and robust, and by diaphoretics and pectoral medicines. The slighter cases recovered spontaneously after a copious perspiration. This disease appeared again in Continental Europe in 1663.— Bartholin, Sylvius de la Boe, and Ettmüller describe the epidemic of the summer of 1669 to have appeared after a severe spring, and variable weather at the beginning of summer. They employed chiefly sudorifics and pectoral medicines in its cure.

5. The epidemic catarrh of the autumn of 1675 was general throughout Europe. Rayger and Peu state that it appeared after a very rainy summer, and that it was preceded by thick mists and fogs, and inconstant weather. Puerperal females in many cases aborted, and others suffered menorrhagia. When the loss of blood was considerable, dropsy, debility, and prolonged convalescence ensued. This epidemic did not prevail in England until the following year. It is described by Sydenham and Ettmüller. The disease commenced with pains in the head, loins, and limbs, with great prostration of strength, cough, pains in the sides and points of the ribs, and occasionally bloody expectoration. Sydenham remarks that the pulmonary affections were merely symptoms of the epidemic aggravated by the cough, and sometimes by a too stimulating treatment and regimen. He viewed the disease as resulting from the action of a cold humid air upon the skin; the fluid secreted by this emunctory being thrown in upon the system, and exciting fever, cough, and disease of the lungs. He directed his treatment chiefly to the fever, and prescribed moderate bloodletting, diaphoretics, laxatives, diluents, and emollients. Large depletions were injurious; and evacuations prolonged the complaint in hypochondriacs and in hysterical females, and rendered the convalescence tedious. Of the less extensive epidemics of 1691, 1695, and 1699, it is unnecessary to take any notice; and those which appeared early in the eighteenth century need only to be slightly mentioned.

6. The influenza of 1729 and 1730 appeared after severe and changeable weather at the beginning of 1729; and traversed the whole of Europe during summer, autumn, and the commencement of winter. It varied in its general characters and complications in different countries, and at different seasons. It was frequently not ushered in by chills or rigors, but by lassitude, depression, headach, pains in the loins and limbs, oppression at the chest, anxiety or pain in the epigastrium, coryza, severe cough, sore-throat, and heat of skin, the pulse being quick and irregular. Swellings of the parotids, or of the tonsils, were not infrequent; and the pulse was often remarkably small and weak. In other cases, horripilations, vertigo, and rigors ushered in the disease, which sometimes assumed a severe character, — delirium frequently supervening. The most violent cases occurred in low, humid, close, or miasmatous localities, and were complicated with pneumonia, pleuro-pneumonia, or with bronchitis; and the fever, in these situations especially, presented somewhat of an adynamic or malignant character. When the complaint was simple, it often terminated from the fourth to the seventh day by epistaxis, or by a slight expectoration of blood, or by the hæmorrhoidal or menstrual flux. In the more complicated cases, congestions of the brain or lungs, and dropsy of the chest, frequently occurred; chronic bronchitis, consumptions, and various other diseases appearing as their sequelæ. It was most dangerous to the aged, and to those who had previous disorder of the respiratory organs. The treatment consisted chiefly of a moderate bloodletting at the commencement of the disease, in the young, strong, and plethoric, in pregnant females, and in the complications with congestion of the brain, or with inflammation of the lungs or pleura; of diaphoretics, diluents, and diuretics; and of mild purgatives followed by anodynes, demulcents, and emollients. (Hoffmann, Beccaria, Morgagni, &c.)

7. The catarrhal epidemic of 1733 appeared in some countries as early as the preceding December, and in some places assumed a more inflammatory character than in others. The head was frequently affected, and hæmorrhages from the respiratory surfaces sometimes occurred. Children and young persons were more frequently attacked than in the influenza of 1729; but the aged, and those already the subjects of visceral disorder, were most severely and dangerously seized. The plethoric and sanguine often presented inflammations of the throat and lungs; and the bilious experienced severe pains in different parts. The intemperate suffered greatly from gastric disorder. Dropsy of the chest often supervened at an advanced stage, or as a sequela of the disease. Bloodletting was injurious, unless in the complications with pneumonia, or pleuro-pneumonia; and even in these it often proved hurtful, when carried too far, or exclusively trusted to. Emetics, mild purgatives, diaphoretics, and demulcents, with diuretics, and afterwards tonics and antispasmodics, were found most generally useful. The same epidemic, as it occurred in the South of England, was described by Huxham, who notices the disposition to perspiration, which appeared about the second or third day and abated the fever, proving a crisis to it about the fourth in the milder cases. He found emetics of great benefit, when there was nausea or biliary disorder. After bleeding, in the pulmonary complications, he prescribed expectorants. His treatment, in other respects, was similar to that already mentioned.

8. Huxham has described the influenza of 1737 to have commenced with chills, headach, coryza, repeated sneezing, and pains in the face, loins, or limbs. Copious defluxions from the nostrils and respiratory passages, severe cough, difficult expectoration, oppression at the præcordia, &c., generally followed. Sore-throats, swellings of the parotids or submaxillary glands, severe pains in various parts, and sciatica were often also complained of — the symptoms varying much with individual constitution, &c. — Many experienced only slight febrile disturbance, which terminated in a moderate sweat; and in others the disease passed into a dangerous peripneumony; and the severer cases were generally followed by great prostration of strength, by consumption, pains in the limbs, or obstinate rheumatism. The treatment was nearly the same as that employed by him in the preceding epidemic; but he found that bloodletting could be carried somewhat further than in it, particularly in the complicated cases. Blisters, diaphoretics, and expectorants were generally pre-

scribed. For the removal of the rheumatism which followed this disease, he employed calomel with purgatives and antimonials.

9. The catarrhal fever of 1742 followed a most severe winter; north-east winds having prevailed for nearly five months. Its characters, were in no respects different from most of the epidemics already noticed. The most severe cases presented signs of adynamia, or even of malignancy, particularly in the aged, debilitated, cachectic, or previously diseased. In the simple form of the distemper, bloodletting and evacuations were injurious; and diaphoretics, expectorants, and diuretics were beneficial, in this and in other forms. But, when the respiratory organs became inflamed, vascular depletion, cautiously employed, was requisite, particularly early in the disease. In this epidemic, paregorics, oxymel of squills, and a gentle emetic at the commencement of the complaint, or immediately after the bleeding, when this was required, were generally employed by HUXHAM, SAUVAGES, and others.

10. The epidemic of 1762 pervaded nearly the whole of Europe, between the months of February and July. Descriptions of it have been left by DE MAERTENS, BAKER, GILCHRIST, WATSON, and others. It proved very fatal to the aged, the asthmatic, and previously diseased; and pregnant females often suffered abortion or premature labour when attacked by it. GILCHRIST, with much justice, viewed this, as well as other epidemics of the same kind, as a fever, *sui generis*, attended by catarrhal symptoms. The course, complications, consequences, and treatment of this influenza differed in nothing from those which preceded and followed it.

11. The catarrhal epidemic of 1775 pervaded Europe, and, like several visitations of the same kind, was not confined to the human species, but affected also the lower animals—often commencing with them. It broke out during a dry and warm summer, following a mild and very dry spring. This was the first epidemic that received the name of *influenza*, it having been generally imputed in Italy to a peculiar aërial influence. It commenced with reiterated chills, lassitude, coryza, sneezings, headach, and wandering pains in the chest, loins, and limbs, followed by fever with incessant cough, copious defluxion, sore-throat, hot skin, a quick soft pulse, pale turbid urine, and vertigo or slight delirium. About the third or fourth day, copious perspiration, hypostatic urine, and free bilious evacuations often took place, and proved critical. It required the same treatment as other preceding epidemics; and when neglected, often passed into asthma, chronic bronchitis, and consumption.

12. Of the epidemic catarrhs, which have occurred from 1775 to 1833 — namely, in 1782, 1789, and 1803 — I shall notice only that of 1782. It appeared in Great Britain between the end of April and the middle of June, and attacked about four fifths of the population. It was least prevalent and mildest in children. It was most severe in the aged, the asthmatic, and the previously debilitated or diseased; and, except these, but few died of it. Like other epidemics of this kind, it seldom continued longer than six weeks in a place. The treatment was similar to that adopted on former occasions. Bleeding was required only when symptoms of pleuritis or pneumonia appeared. Gentle emetics and mild purgatives were useful early in the disease—the former chiefly when the expectoration was difficult. When the expectoration was too profuse, bark or other tonics were required. Where the cough continued long and obstinate, opiates and change of air were most serviceable.

13. From the foregoing brief epitome of some of the most remarkable epidemic catarrhal fevers upon record, it will be observed, that they have been all essentially the same in character, and that they required the same principles of treatment. Certain differences, however, existed, not only in those of which I have made mention, but also in most of those to which I have thought it unnecessary to refer. In some, an inflammatory diathesis seemed more apparent than in others; but when inflammatory complications occurred, they always presented more or less of the asthenic diathesis; or the accompanying, and indeed the primary, fever presented more of a nervous or adynamic, than of an inflammatory form. The constitutional disturbance generally preceded the inflammatory complications; such complications arising out of predisposition, of previous disorder, or of accessary causes. In some epidemics, children and young persons were more affected than in others: but in all, the aged, the asthmatic, the debilitated, and those subject to disorders of the respiratory organs were most seriously attacked. Although the disease was most prevalent between the ages of fifteen and fifty, as in most other epidemic fevers, yet it was least dangerous or fatal at this period. Some of the epidemics differed from others in the presence or severity of the pains in the head, chest, back, or limbs. In some, particularly, the pains assumed the form of a rheumatic complication, which continued after the febrile and catarrhal symptoms had been removed; in others, they seemed to depend upon biliary colluvies, or collections of morbid bile in the biliary apparatus. In some, also, the complication was very generally bronchitis, or pneumonia, or pleuro-pneumonia — whilst in many, sore-throat, with or without swelling of the adjoining glands, or gastric disorder, was more or less evident. Lastly, some epidemics, although almost universal, were comparatively mild; and others were both severe and fatal; the fatality proceeding chiefly from the severity, or extent of the complications, and from previous disease.

14. The *sequelæ* of the several epidemic catarrhal fevers, of which any satisfactory accounts have been left to us, were nearly the same as observed in recent times. These consisted chiefly of chronic bronchitis; of pulmonary consumption; of hæmoptysis; of serous effusion in the thoracic cavities, consequent upon congestions of the lungs, or of asthenic inflammation of the serous surfaces in this cavity; of rheumatic and neuralgic affections in various parts; and of functional disorder of the digestive and assimilating organs.—In some of the epidemics, and in that of 1837, sciatica was a not infrequent remote sequela of the disease. The *treatment* which was found most appropriate in former epidemics will be further referred to hereafter.

15. II. SYMPTOMS OF INFLUENZA.—The account which I shall give of influenza is derived from an extensive observation of its pathology and treatment during the epidemics of 1833 and 1837

—the two most severe visitations of the disease in this country upon record, and especially in London. In both these the distemper was either *simple* or *complicated*.—*A. The simple form* of influenza, was most frequent in the young and middle-aged, and the previously healthy; and usually commenced with chilliness, rigors or horripilations, lassitude, general depression or anxiety, gravedo and headach, followed in some hours by heat of skin, coryza, sneezing, fulness and tenderness of the eyes, soreness of the throat, hoarseness, cough, pain of the back and limbs, loss of sleep, and considerable fever. The cough was generally attended by more or less soreness of the chest, hurried respiration, slight dyspnœa, either pain or a tenderness and bruised sensation at the diaphragmatic margins of the ribs and epigastrium, and wandering pains in the trunk, especially about the sides. Nausea, loss of appetite, sometimes vomiting, costiveness, seldom diarrhœa, and a white, slightly coated, or mucous appearance of the tongue, were also present. These symptoms continued for 24, 36, or 48 hours; the cough being dry, and aggravating the sense of soreness, and the pains about the chest. Afterwards expectoration became more abundant and easy; the skin softer and moister; and the pain of the head or about the frontal sinuses, and in the chest, back, or limbs, less severe. The pulse was generally quick, sometimes a little sharp, usually soft and weak: but it was often irregular, or very changeable and uncertain. As the symptoms became mitigated, about the third, fourth, or fifth day, the perspiration became more abundant, and the urine deposited a copious sediment: yet the cough frequently continued severe and obstinate, and the consequent debility was much greater and more prolonged than the severity or duration of the disease seemed to warrant. In the more severe cases, these symptoms were generally very prominent, and the febrile phenomena fully developed, transient delirium even occurring; but in the slighter cases, several of them were not very remarkable. In this form of the disease, the chest sounded clear upon percussion, and respiration was clear and vesicular, no morbid râle being heard on auscultation; but, as the complaint proceeded, a slight mucous râle was sometimes present.

16. *B.* The COMPLICATIONS, or prominent affections of influenza, were chiefly—(*a*) a peculiar inflammatory condition of the throat and pharynx; (*b*) severe gastric disorder;—(*c*) bronchitis;—(*d*) a specific pneumonia, or pleuro-pneumonia;—(*e*) tubercular phthisis;—(*f*) a form of pleuritis;—(*g*) rheumatism;—(*h*) disease of the heart and pericardium;—and, (*i*) severe adynamic or nervous fever. The frequency of the occurrence of these affections in a predominant form was nearly in the order in which I have enumerated them.—*a.* The *inflammatory state of the throat and pharynx* was very frequent, but sometimes slight. It was always of what has been usually termed an erythematic or erysipelatous kind, but more correctly asthenic or spreading; and attended, as it proceeded, by more or less of a fluid discharge, which served to increase the quantity of matter thrown off at each fit of cough. In the severer cases, this state of inflammatory irritation was accompanied with some swelling; and in many cases, the affections of the bronchi, and of the upper portion of the digestive mucous surface, seemed only the extension of the disorder of the throat and pharynx to these parts. This affection of the throat generally subsided in two or three, or at most five or six, days, after a more or less copious discharge from the affected surface, and sometimes after the extension of disease to the gastric or bronchial surfaces—or rather, after the disorder of the latter had become more manifest.

17. *b. Severe gastric disorder* was indicated by soreness and tenderness at the epigastrium and under the lower end of the sternum, and by nausea and vomiting, sometimes with thirst. It was often very early observed; and when it and the preceding affection were present in the same case,—which was not infrequent,—it was difficult to determine which had been the first to appear, or whether they were coetaneous in origin. Indeed, they seemed often to have been prominent local manifestations of the constitutional disease, arising nearly at the same time. Although rendering the disease more or less severe, increasing the debility and general depression, and prolonging convalescence, the gastric complication was never fatal, or even dangerous. It was sometimes associated with considerable derangement of the biliary functions and secretion, with slight costiveness, and in some cases with diarrhœa; the irritation in these latter having seemed to extend along the digestive mucous surface.

18. *c. Bronchitis* was one of the most frequent and severe complications observed in the last two epidemics, especially in that of 1837. But it was different from the acute sthenic bronchitis usually observed as a primary disease, or as occurring in previously healthy persons. It was attended in many cases with more marked vital depression, with a more copious expectoration of a greyish, viscid, ropy, and less frothy mucus, which often quickly passed into a thin muco-puriform matter, than in idiopathic bronchitis. In most of the cases, both lungs were more or less affected, and the disease seemed rapidly to extend along the larger bronchi to the smaller ramifications, until, in the dangerous or fatal cases, the air-cells themselves became implicated. At the commencement of the bronchial complication, the cough was hard, dry, and severe; but expectoration soon became abundant,—the wheezing from the accumulation of the morbid secretion in the bronchi being often remarkably loud. The cough and the quantity of the sputa were generally increased at night, the former being frequently so severe, and the attendant dyspnœa so urgent, as to prevent the patient from lying down. When both lungs were gravely affected, the patient was obliged to sit or be shored up by pillows. In some cases, the sputa were remarkably abundant, consisting of a very fluid muco-puriform matter, almost from the commencement. In most of the bronchial complications, the *dyspnœa* was considerable, and especially when expectoration was difficult and the sputa copious; still it was often great when the discharge from the respiratory passages was neither abundant nor difficult. The rapid extension of this asthenic form of bronchitis throughout the lungs was most remarkable in the delicate, the aged, the cachectic, and those subject to asthmatic or bronchial disorder. In some instances it quickly superinduced a nervous or asthenic form of pneumonia or pleuro-pneumonia, with which it

further became associated; and occasionally it seemed to have given rise to more or less emphysema of the lungs. The mucous, or the crepito-mucous, rhonchus was generally heard in most of these cases. The pulse was usually upwards of 100, often above 110, and irregular. The severer forms of this complication often terminated fatally, owing to the quantity of the morbid secretion filling the smaller bronchial ramifications, infiltrating the air-cells or even the areolæ of the connecting cellular tissue, and thus occasioning asphyxia.

19. *d.* The *pneumonia*, or pleuro-pneumonia, with which influenza was often associated, was generally of a nervous or an asthenic form. It was either an early complication, or was consequent upon the bronchitic affection. It was indicated by oppression, weight, and anxiety in the chest; by difficult or anxious, breathing; by a crepitous, or crepito-mucous, rhonchus in the vicinity of parts where neither the respiratory murmur nor any morbid sound was heard, and where more or less dulness existed on percussion. The sputa were muco-puriform, distinct, copious, and but rarely bloody or rusty. This complication was always severe, was often further associated with bronchitis, and, in these cases, the patient could not lie on either side, but required to be propped up in bed. The changes observed in the lungs after death were different from those usually consequent upon idiopathic pneumonia (§ 32, 33.).

20. *e. Tubercular phthisis* was generally aggravated by the influenza; and was not infrequently called into existence by it, where the predisposition already existed, or where the tubercles were in a latent or crude state. In some instances, the subsequent stages of consumption were accelerated by it; but few cases terminated fatally during the epidemic seizure, unless at a far advanced stage of the tubercular formations, and then evidence of extensive bronchial disease was generally furnished both during the attack, and upon examination after death. Yet I met with instances of persons in far advanced phthisis, who either experienced comparatively slight attacks of influenza, or had not their malady greatly aggravated, or its course materially accelerated, by the epidemic.—Much of this seemed owing to the treatment pursued in these cases.—The complication of influenza with phthisis was not, in my practice, more frequently attended by *hæmoptysis*, than it is in other circumstances; although hæmoptysis was frequent in phthisis, subsequent to, or developed by, the epidemic malady.

21. *f. Pleuritis* was not a frequent complication, unless connected with pneumonia; but when it occurred, its characters were much modified by the primary epidemic distemper. It generally appeared insidiously, the pains attending it having been often mistaken for the pains of the chest and vicinity usually attending the severe cases of the epidemic; and the latter having often masked the former. In some instances, effusion from the affected surface had proceeded far, before the existence of inflammation was suspected; the matter effused, instead of having consisted more or less of fibrinous or coagulable lymph, as in the sthenic forms of phlegmasia, having generally been fluid, turbid, sero-albuminous, or sero-puriform, and abundant. Hence adhesions of the opposite surfaces were never produced by the pleuritis complicating influenza, although old adhesions were frequently found upon dissection of fatal cases. In rare instances, not only pleuritis, but also pericarditis of a similar character, co-existed with influenza.

22. *g. Rheumatic affections* were seldom observed, even in those subject to them, during the epidemic malady; but they more frequently occurred subsequently, as sequelæ. The wandering, and sometimes severe, pains, characterising influenza, could not be viewed in the light of a rheumatic complication. When rheumatism appeared, it was generally obstinate, and, unless very appropriately and energetically treated, aggravated and prolonged the disease, and protracted convalescence.

23. *h. The complication with disease of the heart or pericardium* was observed chiefly in persons who were previously the subjects of such disease. A form, however, of asthenic pericarditis was met with in rare instances, either alone, or in conjunction with pleuro-pneumonia or pleuritis. But, in such cases, the inflammation gave rise to a similar effusion to that observed in the associated pleuritis already noticed (§ 21.).

24. *i.* In some cases, influenza assumed so severe a character, as nearly to approach *low nervous* or *adynamic fever*, owing to the great depression of organic nervous power, and the delirium and other cerebral symptoms attending it. Yet the disease was very different from these states of fever; and chiefly as regarded the catarrhal or bronchial symptoms, the sharpness or acuteness of the attack at the commencement, the free and general perspirations early in its course, the less loaded and more moist states of the tongue, the pale and turbid condition of the urine, the less complete loss of muscular power, and the much shorter duration of the febrile phenomena, when appropriately treated, in the former malady.

25. *k.* Some other complications were observed, particularly *laryngeal*, *croupy*, or *tracheal irritation*, of various grades of severity, but generally of a similar character to the bronchial affection already noticed (§ 18.), with which these were usually associated. They were seldom, however, met with, as the only, or even as the most prominent, complication. In slight forms, causing, at first, more or less hoarseness, and a harsh, clanging, and dry cough, and, subsequently, a convulsive or strangulating cough, with difficult expectoration and viscid sputa, these affections were very common; and were often either a part, or the commencement, of the phlegmasia which extended from the throat to the bronchial ramifications,— the larynx and trachea presenting, in fatal cases, similar appearances to those seen in the bronchi and pharynx.

26. These were the chief local affections which complicated the last two epidemic catarrhal fevers, and rendered them severe and often fatal. Some of them, it will be seen, were antecedent disorders, not only rendering more violent the epidemic attack, but themselves becoming, in turn, more developed and aggravated by the constitutional disease. Others, again, were evidently called into existence by the epidemic malady, owing to latent predisposition, or to various concurring or accessory causes. Very generally, however, influenza did not supervene upon acute visceral or febrile disease, until the latter was subdued, or

the patient was convalescent. Thus, I saw several patients with bronchitis, pneumonia, &c., near the end of December, 1836, just before influenza had appeared; and, although the epidemic prevailed in the same family during the acme and subsidence of these diseases, it did not attack these persons, until convalescence had either commenced, or had made considerable progress. It was generally severe in such cases, — the constitutional and local affections presenting an asthenic character; but recovery took place in all.

27. *C. Exacerbations* or *relapses* of the disease were sometimes observed after premature exposures and errors of diet; but the relapses were not always more severe than the primary affection; and so rarely occurred, if once the patient was truly convalescent, that they were rather exacerbations, or prolongations, of the disease, in consequence of a superinduced complication, or the production of renewed bronchial irritation. Many of the affections, which were viewed as relapses, were cases of bronchitis or of tracheal irritation, caused by cold during convalescence, and increased or modified by existing disorder of the digestive canal and of the biliary organs, and by debility.

28. *D. Certain of the symptoms* require a brief notice. — The *tongue* was not materially affected in many: in some, it was white; in others, it was covered by a soft, or creamlike, or yellowish, mucus or fur. The *fauces, pharynx*, and tonsils were generally red. There was always loss of *appetite*, and generally *nausea* or *vomiting* at the commencement; in some, bile was thrown up. *Thirst* was not complained of in the majority of cases. The *urine* was usually thick or turbid, somewhat red, and deposited a pink sediment as the attack subsided. *Cough* was always present from the first day, and was often very severe for two or three days; but it was often prolonged, sometimes after the subsidence of the attack, and assumed a convulsive form. There was often *dyspnœa*, with more or less wheezing and restlessness; but chiefly in the complicated cases, or in asthmatic persons. The *expectoration* was chiefly mucous, and as already described, unless in the bronchitic or pulmonic complications, or in those subject to chronic catarrh or bronchitis; and in these it was muco-puriform. No morbid *rhonchus* or *râle* was heard in most of the simple cases, although the cough and dyspnœa were severe. The *pulse* was more or less accelerated, generally soft, weak, and occasionally small, especially as the disease advanced; but it was often irregular — being at one time sharp, hard, or wiry, for a short period, and then becoming soft and weak. The sharpness or fullness of the pulse sometimes led to bloodletting, which was seldom of service, even when the disease was associated with inflammation, unless prescribed in great moderation, and at a very early stage. In London, however, bloodletting was rarely indicated by the symptoms; the phlegmasia often complicating the disease, being decidedly asthenic, and more frequently aggravated than ameliorated by vascular depletions. The *blood* was sometimes buffed in the complicated cases; the buff being deep and gelatinous, but seldom cupped or tenacious. Much mental and physical depression *existed;* and the character of the *febrile* or *constitutional affection* was decidedly *nervous* from the commencement, vascular action being more or less asthenic or adynamic throughout. But the febrile symptoms varied much, not only at different periods, but also at the same stage, according to the constitution, previous health, and age of the patient, and to the severity and complication of the disease.

29. *E. The sequelæ of influenza* were sometimes more dangerous than the primary malady; and the severity or danger of these had frequently no relation to the violence of the epidemic seizure; for the consequent affections were often most serious in persons who had experienced a comparatively mild attack of influenza, and as frequently slight in those who were severely attacked. — *a. Tubercular consumption* was observed chiefly in those who had an hereditary tendency to the disease, and in whom tubercles had evidently existed in a latent, undeveloped, or crude state — the influenza having promoted their evolution. — *b. Chronic bronchitis* also not infrequently occurred; either the bronchial complication having degenerated into a chronic and asthenic form, or this form having appeared during convalescence from the influenza, owing to the predisposition left by it. In either case, the disease was obstinate, and required a restorative treatment and regimen, with change of air. — *c. Asthmatic affections*, often presenting a nervous, convulsive, or spasmodic character, in conjunction with bronchial congestion or irritation, and sometimes with considerable bronchial discharge, were occasionally met with in persons advanced in life. In these, the cough, dyspnœa, and wheezing were more or less distressing; and complete or even partial relief was afforded with difficulty. — *d. Disease of the heart* was sometimes a sequela of influenza; but it might have existed previously, although it did not become so fully developed as to attract attention, until subsequently to the epidemic attack. Indeed, a more or less asthenic *endocarditis* or *pericarditis* may have occurred as a complication of influenza at some period of its course — this latter rendering the former still more obscure, until the more advanced consequences of the complication, and the subsidence of the primary malady, rendered the nature of the lesions more manifest. However induced, there can be no doubt that lesions of the heart of various kinds, and such as usually result from inflammatory irritation, were often met with in those who had experienced severe seizures of the epidemic. In some, the disease of the heart was associated with asthma or with more constant dyspnœa, and seemed aggravated by the debility consequent upon the influenza, especially in chronic cases, and where the heart-affection was not decidedly inflammatory. — *d. Hæmorrhage* from the respiratory organs was occasionally met with in those labouring under phthisis; but it may also have arisen from congestion of the lungs and interrupted circulation through the heart. — *e. Dropsies*, especially of the *thoracic cavities*, were sometimes observed as consequences, more or less remote, of severe attacks of influenza, particularly where the lungs had been implicated, or where disease of the heart existed previously, or where asthenic pericarditis had existed as a complication. But still dropsy was not so frequent a sequela of this as of some other epidemics. — *f. Obstinate dyspepsia*, and other *functional disorders* of the *digestive organs*, were very common sequelæ of this malady; and generally required change of

air, with strict attention to diet, for their permanent removal. — *g. Rheumatism* was a not infrequent consequence of the epidemic, and, as far as my experience enabled me to judge, was most benefited by a restorative and tonic treatment, with antacids, sometimes with colchicum, and change to a dry pure air.

30. III. Progress and Duration.—The disease generally presented an acute stage, lasting from three to five days, and, in the slighter cases, terminating either then, or in two or three days. But it more frequently, especially in the severer seizures, continued, in a less acute form, for a period varying from five to fifteen days longer.— The course and duration of the complicated cases were very indefinite; and the recovery from these, as well as from all the most severe attacks, was attended with great debility, which often continued for a long time, even although none of the *sequelæ* or consequences just mentioned were manifested.

31. IV. Diagnosis.—*Influenza* may readily be confounded with *acute bronchitis*, and with common or *sporadic catarrhal fever*, but may easily be distinguished from them, by attention to the following circumstances: — Influenza commences with very manifest disorder of the organic nervous system, as in all other idiopathic fevers, or epidemic maladies; and, although a predominant affection of the respiratory passages soon takes place, yet the digestive organs and circulating system are also more or less deranged. The dyspnœa attending influenza is much greater, relatively to the other indications of disorder in the lungs, particularly those furnished by the aid of the stethoscope, than in the complaints just mentioned. The pains complained of in the head, loins, limbs, and about the insertion and edges of the diaphragm; the severity of the cough in the night, and the general insomnia; the physical depression, and the weakness and irregularity of the pulse; the epidemic prevalence of the disease; and the different effects of medicine in it, and in those disorders; further serve to distinguish between them. — Influenza differs also from the *catarrhal fevers* of spring and autumn, in the great debility, in the spasmodic pains and disturbance of sensation generally, in the nausea and vomiting, in the disposition to sweating, and the occasional appearance of an exantheme, and in the peculiar expression of the face, which attend it; in its almost universal prevalence, and in the danger to the aged.

32. V. Appearances in Fatal Cases.—The changes observed after death were referrible — 1st, to pre-existent disease; and, 2d, to the effects of the epidemic and of its complications: to these latter only attention need be directed. The *trachea* and *bronchi* contained more or less of a frothy, muco-puriform, and frequently sanguinolent, matter, which was most abundant in the smaller bronchi. The *mucous membrane* lining these parts was generally of a dull red, or of a livid or dark hue, from congestion of the small vessels, and softened and thickened. These appearances were sometimes confined to one lung, but they more generally extended to both. The *substance of the lungs* was often darker than natural, and of a livid or violet colour. The air-cells, and frequently the tissue of the organ, seemed partially infiltrated by a muco-puriform, or muco-sanguinolent, fluid, which rendered it denser, and less crepitant on pressure, than usual; and its vital cohesion was much weakened. In aged, asthmatic persons, the lungs were generally very dark-coloured, much softened, infiltrated with fluid, partially emphysematous, and otherwise changed; a dirty or turbid serum being sometimes effused into the cavities of the thorax. The *pleura* was occasionally partly or very extensively adherent; but the adhesions were always the consequences of old disease. The *blood* in the heart and large vessels was generally dark and fluid.

33. In the younger and more robust subjects, where the indications of associated pneumonia were the most manifest, the lungs were also of a dark hue, congested, infiltrated with a dark or sanguinolent fluid, much denser than natural, or splenified, no longer crepitant, but not truly hepatised, as in true or sthenic inflammation; for the matter thus filling the areolar tissue of the organ was not a coagulated or fibrinous lymph, but an uncoagulable fluid, which could be more or less completely squeezed out of the part. The substance of the lungs was also torn with greater ease than usual, and the bronchial mucous membrane and bronchi presented the appearances already described (§ 32.). Both lungs were thus diseased, in many cases; and, even when one lung only was affected, the inflammation was more or less diffused, as in other instances of asthenic phlegmasia. In some, the most depending portions of the lungs were most infiltrated and congested—showing that the changes had partly taken place at the time of, or subsequent to, dissolution. —Appearances of asthenic inflammation were, in a few cases, observed in the *heart* and *pericardium*, with the effusion of a dirty serum into the latter; and, as Dr. Clendinning has remarked, in his excellent paper on the disease, these lesions were generally associated with those produced by pneumonia and pleuritis. Old disease of the heart was met with in many aged persons; and, in those who had been labouring under tubercular consumption, the bronchial mucous membrane, and tissue of the lungs between the tubercular formations, presented very similar changes to those described. The *digestive mucous surface*, particularly of the pharynx, œsophagus, and stomach, was congested, and sometimes presented patches or streaks of a dark red, or livid hue. — I never saw the exudation of lymph or coagulable albumen in the small bronchi, resembling the false membrane of croup, which Dr. Gluge says he met with, nor is it mentioned by any other writer. My own dissections were few; but I have adduced also the results obtained by Drs. Clendinning, Macleod, Graves, and others.

34. VI. Causes. — The seasons, and the state of the weather both antecedently and at the time of the outbreak of influenza, have had no share in its production. Whether appearing in spring, summer, autumn, or winter; or occurring in mild and dry, or in cold and moist weather; or prevailing in cold, temperate, or warm countries; it has presented the same general features: and, even in seasons and climates most likely to have rendered it more than commonly mild, it has sometimes assumed a severe form; whilst it has presented a milder character in countries where it might have been expected to have been a more formidable disease. No dependence, therefore, can be placed upon climate, season, and weather,

in modifying its severity or complications, although they doubtless have had more or less influence in this respect on some occasions.

35. This epidemic has not arisen from the prevalence of easterly, northerly, or other winds; for, not only have winds from such quarters prevailed without influenza having occurred, but it has broken out in different places during the prevalence of winds from different quarters. That it has not proceeded from cold in any form or way, is proved by the circumstance of persons who took the greatest care of themselves, as respects clothing and exposure, having been attacked as well as those who were constantly subjected to the vicissitudes of season and weather. Yet, in some instances, as Dr. Graves has remarked, exposure to cold determined the immediate access of the disease, or increased its violence when present; and I would add, gave rise to several of its complications. No kind of occupation seemed to protect from its visitation; nor did the impregnation of the air with gaseous fluids, usually considered disinfectant, have this effect. It is probable, from the very rapid progress of the complaint over nearly the whole globe, that it depended, either, as Dr. Graves suggests, "upon telluric influence — upon some agency connected with variations in the physical conditions which operate on the external surface of our planet;" or upon a very general change in the usual conditions of the electricity circulating on the surface of the earth: but these, in the present state of our knowledge, are merely conjectures.

36. As to the influence of *infection*, in causing and propagating influenza, some diversity of opinion exists: but the question admits of a tolerably easy solution. That the disease neither originated in, nor was diffused by, *contagion*, direct or mediate, seems satisfactorily proved, by the nature of the disorder, and by the phenomena and circumstances connected with its appearance and spread. No facts have been adduced of a contagious property, according to the meaning I have attached to the term (see art. Infection, § 1—3.), having belonged to it; whilst numerous circumstances, showing that it was devoid of such property, have been observed by all who were practically acquainted with it. The almost simultaneous outbreak of the epidemic in distant countries; the rapidity with which it traversed immense spaces; the fact of its often pursuing, in its spread, a different course from that of human intercourse; the great numbers attacked at the same time, when it appeared in a town or district; and the frequent suddenness of the seizure; showed that it proceeded chiefly from a very generally diffused change in the atmosphere, that modified or infected the system in a determinate manner. That this malady depended principally upon atmospheric influence, these and other considerations fully prove; but that, in some instances, other agents or causes concurred with, or aided this, the principal cause, may be admitted. These other concurring or aiding causes seem to have been the ordinary exciting causes of catarrh, and infection proceeding directly from those labouring under the malady. It was often observed that communincation with those already attacked appeared to favour the developement of the complaint in the healthy; for, when an individual came with the disease from a distance, the inhabitants of the house in which he arrived were usually the first attacked. But it must be conceded, that this infection was a very subordinate cause to that, upon which the epidemic principally depended; and that it was merely a concurrent and contingent circumstance in the diffusion of the complaint.

37. The disease was not very materially influenced in its spread by *age*. It was, however, most prevalent in persons of from 16 to 60; and, upon the whole, the least prevalent and most mild in children, although severe and complicated seizures were not uncommon even in them. It was very frequent, most complicated, and severe in the aged — from 60 upwards. *Sex* and *temperament* did not appear to have influenced the liability to an attack. It did not appear that a former seizure caused exemption from it afterwards. The Author attended several persons in the epidemic of January, 1837, who had been attacked, as well as others who had not been attacked, by that of 1833; but he also saw some who had the influenza of 1833, and who escaped that of 1837. He is acquainted with very few instances of entire exemption from both these epidemics. He and his family escaped on both occasions. Generally, when one in a family was seized, the majority of its members were soon afterwards affected; but often two or three were attacked so nearly at the same time that it was difficult to assign the priority to any one. The epidemic continued about six or seven weeks in a place; but a few cases occurred just before, and others not until a short time after, its general prevalence. A circumstance of some importance, although very frequently overlooked, in respect not only of the two latest, but also of former epidemics of this kind, has been observed, and recorded by several writers; namely, the appearance of the complaint, also as an epidemic, among many of the lower animals, particularly horses and dogs, for some weeks or months before the outbreak of it in the human species.

38. VII. Nature. — It was evident, from an attentive consideration of its phenomena, that influenza partook largely of the characters of an epidemic fever. It was also manifest that the exciting cause of the complaint, whatever may have been the nature of that cause, existed in the air, and that, by this medium, it morbidly impressed the organic nervous influence, especially in the respiratory organs, where its first invasion took place in the process of respiration; these organs thus becoming and continuing prominently disordered. This primary and especial affection of the organic nervous influence was shown by all the premonitory and early symptoms. That this affection was not only peculiar or specific, but was further characterised by depression — that the organic nervous energy was remarkably weakened as well as otherwise changed — was evinced by the lassitude and debility which were present from the commencement of the seizure; by the affection of the digestive and circulating organs; by the spasmodic and nervous pains in the trunk and limbs; by the states of vascular action and of the blood; and by the general debility produced by the complaint. The circumstances of the pains not having been aggravated by pressure, of their wandering and diffused character, and of the spasmodic nature of the cough, were proofs that the disease was not essentially inflammatory, although

inflammation of a more or less asthenic form sometimes supervened. This position was further strengthened by the state of the circulating organs and fluids, and by the appearances observed in fatal cases. That fever, or rather increased temperature of the surface of the body, was not remarked in some cases, and in some even of the most dangerous complications of the disease, did not militate against the opinion of influenza being an epidemic fever *sui generis*, with early and prominent disorder of the respiratory passages and organs.

39. VIII. Treatment. — The *milder* and *simpler states* of influenza required little more than the early restoration of the cutaneous exhalation by diaphoretics, and the evacuation of disordered secretions by mild chologogue purgatives. In the majority of cases, five grains of blue pill and six of compound extract of colocynth, with one of ipecacuanha, given at bed-time, and a mild aperient the following morning if these did not act freely, were extremely useful; but, if there were nausea or retchings, seemingly proceeding from biliary disorder, a mild *emetic*, or the warm infusion of chamomile flowers, was premised with advantage. Subsequently diaphoretics, consisting of camphor mixture, solution of the acetate of ammonia, and the spirit of nitric æther, sometimes with a little ipecacuanha or antimonial wine, were given every third or fourth hour. In many instances nothing further was necessary; but, when the bowels required aid, a draught consisting chiefly of the compound infusions of gentian and senna, or a pill containing compound extract of colocynth, the extract of hyoscyămus and ipecacuanha, was taken at bed-time.

40. In the *more severe attacks*, and when much febrile excitement and heat or dryness of skin were present at the commencement, a full dose of calomel, with James's powder, and a grain of camphor, was given at bedtime, a purgative draught being taken in the morning. The diaphoretic prescribed above (§ 39.) was also taken every three hours, with a few drops of antimonial wine, until a free perspiration was produced. A warm bath was occasionally prescribed at bed-time, and generally was of great service. After a free perspiration had been procured, a few drops of the aromatic spirits of ammonia were substituted for the antimonial wine; and, as the disease declined, mild restoratives or tonics, and a light diet, were found most beneficial.

41. When the *cough* was very severe, and dry, or attended by much soreness at the chest, a larger dose of calomel and James's powder was prescribed, as much tartarized antimony as the stomach could bear was given in the diaphoretic mixture (§ 39.), and the warm bath, and warm demulcents, were resorted to. As soon, however, as the cough became more loose, and the defluxion from the respiratory surfaces either free or abundant, the calomel and the antimonials were relinquished, and the less depressing diaphoretics prescribed. The application of a mustard poultice, or of the warm turpentine fomentation, to the chest, or of a rubefacient plaster between the shoulders, was also serviceable. At an advanced stage of these cases, the following pills, either alone or in addition to warm diaphoretics, were found most beneficial, especially in aged or weak persons.

No. 268. ℞ Camphoræ rasæ, Massæ Pilul. Ipecacuanhæ Comp., āā ℈ j.; Extr. Hyoscyami (vel Extr. Papaveris) ʒ ss.; Mucilag. Acaciæ q. s. M. Fiant Pilulæ xviij., quarum capiat duas, quartâ, quintâ, vel sextâ quâque horâ.

No. 269. ℞ Massæ Pilulæ Scillæ Comp., Massæ Pilulæ Galbani Comp., āā ℈ j.; Pulv. Ipecacuanhæ gr. vj.; Extr. Conii (vel Extr. Papaveris) ℈ ij.; Olei Anisi q. s. M. Fiant Pilulæ xxiv., quarum capiat duas, quartis vel sextis horis.

42. When influenza was *complicated with bronchitis*, or with *pneumonia*, a modification of the above treatment was generally requisite. Much mischief, however, was produced — as I witnessed in several instances, in consultation — by having recourse to a too antiphlogistic means, and to large depletions, in these complications. Not infrequently, also, congestion only of the bronchial mucous surface, or of the lungs, and great accumulations, or inordinate secretions, of mucus in the smaller bronchi, were mistaken for bronchitis and pneumonia, and treated accordingly. Even where inflammatory action was more decidedly evinced, the fact of its association with an asthenic or adynamic condition of nervous power and of vascular action, was often overlooked, and a truly *nervous* or *asthenic pneumonia*, or *bronchitis*, was treated too generally in the same manner as the primary and uncomplicated states of these inflammations. The same remarks are nearly equally applicable to the occurrence of *pleuritis*, or of *pericarditis*, in the course of the malady. Even for these, bloodletting and the rest of the antiphlogistic treatment required the utmost caution. They were beneficial only when *very early* and moderately prescribed. I derived great advantage in these complications, from the application and repetition of embrocations or fomentations with spirits of turpentine, or with either of the *liniments* in the Appendix (F. 296. 311.), until considerable redness, or even vesication, was produced. Calomel or blue pill, with camphor and henbane, and sometimes with digitalis or ipecacuanha, or James's powder, was generally of service; and a diaphoretic mixture of camphor julep, the solution of the acetate of ammonia, spirits of nitric æther, or a small dose of antimonial or ipecacuanha wine, was very commonly prescribed. As the more inflammatory state subsided or disappeared, the aromatic spirit of ammonia was substituted for the antimonial preparation; and a restorative regimen and change of air recommended. (See arts. Lungs — *Asthenic Inflammation of*; and Pleura — *Asthenic Inflammation of*.)

43. If *bronchitis* degenerated into a chronic state, camphor, the decoction of senega, or preparations of squills or of ammoniacum, were employed; and the more permanent derivatives and counter-irritants resorted to. In such cases, the means described in the article Bronchi (*Chronic Bronchitis*, § 93—103.), rarely failed of removing all disorder.

44. In the complications with *affection of the throat, larynx, or trachea*, the warm terebinthinate fomentations or embrocations, already noticed, applied around the throat and neck, never failed of imparting complete relief; the rest of the treatment already described being generally adopted. Blisters to the throat were injurious; but, when applied to the nape of the neck, or over the sternum, they were often of service. Early in these complications, as well as in the association with bronchitis, an emetic of ipecacuanha was frequently beneficial. The warm bath, the semi-

cupium, and pediluvia were also sometimes of service. When there was much tenderness of the epigastrium, and *gastric irritation*, a mustard poultice, or the warm terrebinthinate fomentation, or other rubefacients, applied to this region, and purgative enemata, generally afforded relief.

45. At an advanced stage of the complaint, when, in consequence of its severity or complications, the powers of life indicated much depression, by the state of the pulse, the perspirations, or the abundance of the sputa, or difficulty of expectoration, camphor, quinine, ammoniacum, senega, ammonia, and other expectorants and restoratives, in liberal doses, were indispensable.

46. During convalescence, change of air, a restorative regimen, and the use of flannel nearest the skin, were commonly necessary. In other respects, the same means as have been advised for the treatment of Debility (§ 35. *et seq.*), and for convalescence from Fever (§ 167. 612.) were then requisite.

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INSANITY. — Syn. Μανια, παραφροσυνη, παραφρονια, παραφρονησις, Hippocrates, Galen. *Paraphrosyne*, *Paraphobia*, *Dæmonia*, *Dementia*, *Moria*, Auct. Lat. *Mania*, Boerhaave. *Amentia*, Vogel, Sagar. *Delirium Maniacum*, Hoffmann. *Phrenitis Apyreta*, Sauvages. *Vesania*, Linnæus, Cullen, Parr. *Ecphronia*, Good. *Mania Universalis*, Young. *Unsinnigheit*, *Tollheit*, *Schwermuth*, *Mondsucht*, Germ. *Folie*, *Démence*, *Phrénèsie*, *Manie*, Fr. *Mania*, *Insania*, Ital. *Madness*, *Mental derangement*, *Lunacy*, *Mental aberration*, *Unsoundness of Mind*.

Classif. — 2. *Class*, Nervous Diseases; 4. *Order*, Mental Disorders (*Cullen*). 4. *Class*, Diseases of the Nervous Function; 1. *Order*, Affecting the Intellect (*Good*). I. Class, III. Order (*Author*, in *Preface*).

1. Defin. *A deviation from, or perversion of, the natural and healthy state of the mind, as manifested either by the moral emotions and conduct, or by a partial or general disorder of the intellectual powers and understanding.*

2. *Insanity* — *Insanitas* — was formerly employed to signify a deranged state of the health, either of body or mind. But it became more especially applied to mental disorders — *Insania* — and lately has been entirely limited to them. It may be considered to comprise all morbid manifestations of mind, whether partial or general; or with whatever series of symptoms they may be accompanied, whether with those of excitement, or of depression, of any of the functions, either of mind or of body. Insanity, however, and especially certain moral states of it, is often nothing more than an exhibition of the natural character, and moral disposition of the individual, over which reason has ceased to exercise its control, or which has become remarkably prominent, or even per-

verted by excessive indulgence and unexercised restraint. The inordinate gratification of passions or moral emotions, not only gradually weakens the influence of reason and of self-control, but also imparts to these emotions a perverted and truly morbid character, and allows them to assume forms at variance with the established opinions and habits of the world, and with the laws of society.

3. It is extremely difficult, if not impossible, accurately to *define* insanity, or to draw a line of demarcation between it and what has usually been denominated singularity of opinion, or eccentricity of conduct. The latter states, viewed either in their moral or in their intellectual relations, insensibly pass into various acknowledged varieties of the former, and are often merely states of transition from the healthy mental manifestations, to a condition indisputably morbid. Since the time of LOCKE, it has generally been considered, that the insane have not lost the power of reasoning; but, having entertained, as real, some illusion or erroneous impression, they err, by reasoning from wrong premises. This idea appears to have been adopted by CULLEN, who remarks, that "there is generally some false perception of external objects, and that such false perception necessarily occasions a delirium or *erroneous judgment*, which is to be considered as *the disease*." But this, too limited a definition, was more extended where he states insanity to be, "in a person awake, a false or mistaken judgment of those relations of things which, as occurring most frequently in life, are those about which the generality of men form the same judgment, and particularly where the judgment is very different from what the person himself had before usually formed." But, as Dr. PRICHARD has remarked, these definitions apply only to one class of cases, and especially to *melancholia*, *monomania*, or *partial insanity* — to these forms, in which certain illusions exist, and the judgment is *comparatively* clear on all other topics unconnected with the illusions entertained. But, although the judgment seems comparatively clear on other topics than those connected with the morbid illusion, yet it must not be considered with LOCKE, that the insane make right deductions from their illusions. As Dr. CONOLLY has more justly observed, "the judgment is but the result of comparison; comparison is alternate attention; attention is a faculty dependent on the brain," — and one, I would add, which is most early and most generally disordered in mental diseases. I therefore quite agree with this writer, that, in all cases, even of partial insanity, the judgment is more or less weakened and perverted.

4. Besides the above limited forms of insanity, there are others of a more general and manifest kind — namely, 1st, *Maniacal* or *raving insanity*, in which the mental manifestations are more generally and more severely affected, the derangement being characterised by great excitement, wildness, violence, and absurdity; 2dly, *Imbecility*, and *Incoherent*, or *fatuous insanity*, in which the mind is altogether incapable of any effort; the intellects being remarkably impaired, and the ideas being rapid, unconnected, or incoherent. To the preceding forms, in which the *intellectual manifestations* are primarily and chiefly disordered, some recent writers have added another, viz. *Moral insanity;* in which the intellectual powers are but little, or not very manifestly, impaired; the disorder appearing chiefly in the emotions, habits, and conduct. In this form of mental disease, the moral and active powers are perverted or depraved; self-government is either greatly impaired, or altogether lost, and the individual is incapable of conducting himself with propriety, in many of the relations of business and society. As Dr. PRICHARD observes, "his wishes and inclinations, his attachments, his likings and dislikings, have all undergone a morbid change; and this change appears to be the originating cause, or to lie at the foundation of any disturbance which the understanding itself may seem to have sustained, and even, in some instances, to form, throughout, the sole manifestation of the disease." It must not, however, be supposed, that the understanding, in such cases, is altogether unaffected. It may not present any very obvious delusion or aberration from the usual condition; but it is certainly more or less weakened; and the patient is incapable, from habit or from impaired nervous power, of exerting those manifestations of mind upon which judgment and self-control depend, with the vigour and precision of health. Besides, the indulgence, or the inordinate excitement or sway, of the emotions and passions, leading to moral insanity, necessarily tends to weaken or to obscure the understanding, and ultimately to overturn it altogether.

5. Whilst we observe insanity arising almost insensibly from the misdirection of certain manifestations of mind, from the excitement or the over-indulgence of others of these manifestations, and from the utter neglect of some of them, aided by an impaired power of attention and comparison; we not infrequently also perceive it to proceed from those diseases and injuries which affect, more or less remarkably, the functions, circulation, and organisation of the body, and particularly of the brain and nervous systems: — fevers, in which vascular excitement becomes inordinate, or in which organic nervous or cerebral power is much depressed, frequently, derange the mental powers in their course; and the derangement, owing to organic lesion produced in their progress, may become more or less permanent. The cerebral functions are generally disordered in the more severe cases of inflammation of the brain or of its membranes, and the disorder often assumes a most violent form; but it either entirely disappears, or partially subsides, with the removal of the organic condition upon which it depended, unless when the brain has sustained some injury that unfits it for the performance of its offices. In all these instances, however, the mental alienation is merely a consequence, or symptom, of the bodily disease, which has assumed its specific form and character before the mental affection appeared. It must not, from this, be supposed, that mental disorder is not, in its more chronic and primary forms, quite unattended by signs or symptoms of physical disease, referrible either to the system generally, or to the brain more particularly, or even to both. Cases of insanity are comparatively few, in which no indication of such disease is to be traced; the chief differences being, the obvious nature, the extent, the duration, and the kind of bodily affection which has preceded, and which accompanies the mental disorder.

6. When, however, insanity has proceeded

from bodily disease, or from external injury, the latter either may have been entirely removed, or its effects only may remain; the former enduring either for a time, or more permanently, owing to the consequences of the physical affection upon the nervous power, or upon the intimate organisation of the brain, and yet the organic functions may manifest little or no disorder.

7. *Insanity* may, therefore, be viewed as a generic term, comprehending every grade of *perversion* of the *moral*, or of the *intellectual*, or of the *instinctive, manifestations of mind*, or, of any two, or of all these classes of manifestations, from the healthy states,— to such perversion, a more or less manifest but variable alteration of the *sensations, perceptions, judgment*, and *voluntary movements*, being usually added; or, in other terms, the essential phenomena of insanity are — a more or less manifest or extensive change of the functions of the brain from their accustomed healthy condition — of the sensibility, the perceptions, the intellectual and moral powers, the judgment, and the movements, without any profound, obvious, or durable affection of the organic functions.

8. Yet these latter functions are not always, or even generally, devoid of disorder. They have been too commonly either overlooked altogether, or imperfectly attended to, or insufficiently investigated; the predominance of disorder of the cerebro-spinal nervous system, and preconceived notions of the relations of mind to organisation, and of the nature of insanity, entirely occupying the attention of the observer.

9. The history of medical literature, in respect of insanity, shows, that the study of the malady, and a knowledge of its pathology and treatment, have been long influenced and retarded by prejudice and superstition, by attributing all mental disorders to supernatural agency, or by considering them in the spirit of system. It has been justly remarked by M. Foville, that works on mental alienation present the two principal characters distinguishing medical writings; — the one class being dictated by observation, and containing information, the accuracy and the utility of which can never be impaired; the other imbued with the spirit of system, and manifesting all the follies that may be conceived. The chief advantage that can be derived from the latter class of writings is, to induce us to examine, for the guidance of our own opinions, the phenomena of mental disorder with the strictest attention; to limit ourselves chiefly to the description of what we observe, and to submit with the utmost caution to the ambition of explaining.

10. In *treating of insanity*, I shall closely adhere to the results of observation, and describe — 1. The phenomena, the essential and accessory symptoms; 2. The diverse forms and classification; 3. The terminations; 4. The organic lesions observed in fatal cases; 5. The predisposing and exciting causes; 6. The physiological pathology; and, 7. The treatment of insanity. — *Connate Insanity* or *Idiotcy, Puerile Imbecility, Puerperal Insanity*, and, lastly, *Suicidal Insanity*, will be afterwards considered in distinct chapters.

11. I. Symptoms of Insanity. — The study of the phenomena of insanity, according to the several functions chiefly affected by it, is of great importance, not only in arranging the various forms of the malady, but also in classifying the patients, and in determining with precision and success the method of treatment. In the general view, therefore, which I am about to take of the essential and related symptoms of insanity, I shall consider,—1. Those furnished by the *sensibility*, or connected with the *impressions*, the *sensations*, and the *perceptions*; 2. The phenomena exhibited by the *instinctive*, the *intellectual*, and the *moral manifestations*; 3. The symptoms connected with the *locomotive apparatus*; and, 4. The phenomena furnished by the *organic functions*. In the *general description* here about to be entered upon, I shall confine myself to those states of insanity, the existence of which admits not of dispute, and leave, until I come to the consideration of the special forms of alienation, the discussion of those *states* which are the least manifest, or which have not been generally admitted as constituting forms of insanity, either from their *slight or partial nature*, or from the circumstance of the *moral manifestations* being chiefly affected, the intellectual powers being much less prominently disordered (§ 4.).

12. i. The Symptoms furnished by the Sensibility are extremely numerous and diversified. They consist chiefly of false perceptions, arising from one or other of the following sources: — 1st, from disorder of the organ receiving the impressions; 2dly, from an affection of the nerves conveying the impressions, the organ itself being sound, 3dly, from profound disease of the parts destined to perceive them, the morbid impression taking place without any external excitement or cause; and, 4thly, from disorder of the general sensibility. But, as will be shown in the sequel, false perceptions, or illusions, more frequently proceed from two or more of these sources, than from any one singly.

13. *A. False perceptions arising from a disorder of the organs receiving the impressions*, are evinced by the state of these organs, particularly in regard of the presence of actual disease of them, and by the effects following the abstraction of their respective stimuli. The existence of disease will generally be ascertained upon a close examination of the sense, whose functions seem especially disturbed; and it is not infrequently observed, both where disease of the sense exists, and where it cannot be detected, that the shutting out of the appropriate stimulus — as by closing the eyes, or the ears, or the nostrils — arrests the morbid perception haunting the patient, by preventing the production of sensation. Esquirol, Reil, and Foville suppose that, where the morbid perception thus ceases upon shutting a particular sense, the cause of it exists in that sense: but this is not the case; the error arising from the circumstance of their confounding, with most of their countrymen, sensation with perception. A sensation will be morbid where the organ is disordered, but it will not necessarily be followed by a morbid perception, unless either the nerves conveying the sensation, or the brain itself taking cognisance of the sensation, be disordered, as respects either the state of its organisation or circulation, or the discharge of its functions. In cases, therefore, where closing the organ of sense causes a morbid perception to cease, such perception is not to be referred altogether to the state of the senses, but partly also to the organ of intelligence — to the understanding, which is obviously incapable of correcting or judging aright the re-

port conveyed by the sense especially affected. Indeed, the intellect may be so weakened as to be more than usually susceptible of derangement, either when inordinately excited by the senses, or when manifest disease of them exists. In cases of this description, the mind is incapable of paying due attention to the various circumstances connected with the morbid sensation or impression, of comparing them, and of judging them as in health; and this obtains especially when the sensation is novel, or even indistinct, as well as when it is inordinate, or too strong, relatively to the nervous susceptibility—to the cerebral power of the patient; and when it either forcibly or unusually impresses a mind already more or less deranged. Although, therefore, the disorders referrible to the senses, as ophthalmia, amaurosis, ottitis, ozena, caries of the teeth, &c., are sometimes concerned in the production of false perceptions in the insane; yet equally much, if not more, is to be imputed to the brain itself, and to its functions, which are mainly concerned in producing the morbid perception, and are obviously incapable of ascertaining the illusion: the morbid *sensation* appertains to the sense, and the nerves connected with it, but the false *perception* is chiefly the act of the brain.

14. *B. False perceptions without disease of the organs of sense.*—False perceptions of this kind have been called *illusions* by some, and *hallucinations* by others. M. Esquirol proposes to confine the latter term to them; and he defines them to be sensations perceived at a time, when there are no appropriate external objects present to excite them in the organs of sense. This class of false perceptions is much more common than the foregoing, and occurs in every possible form. Both the blind and the deaf may be subjects of illusions of the senses of sight and hearing respectively. The majority of those who are haunted by hallucinations of this kind suffer more in solitude, in darkness, and during silence, when the senses are in a state of repose, than in other circumstances. The distractions, incitements, and sensations experienced in society sometimes allay or obscure these illusions; but, however powerful, much more frequently they have no such effect, the mind continuing, nevertheless, to be engaged only with its morbid perceptions. The patient, when he speaks, is interrupted by them; he answers to voices which call upon or address him, or contemplates objects which have no existence.

15. Sometimes the illusions relate to one sense, and occasionally to more than one, or even to all the senses. Those of hearing are the most common; next those of sight, smell, and taste; the illusions connected with the two last being often associated. Those belonging to the sense of touch are the most rare.

16. Darwin supposes that hallucinations proceed from inflammation of the origin of the nerves of sensation; and M. Esquirol says, that "the false sensations of those subject to hallucinations are images and ideas reproduced by the memory, associated by the imagination, and personified by habit. A person in such a state converts the product of the understanding into a corporeal form; he dreams while he is awake; but, in those who dream, the ideas which were entertained while awake continue during sleep, whilst he who is in a delirium perfects his dream when waking." M. Foville justly remarks upon this opinion of M. Esquirol,—1st, That hallucinations often do not furnish precise or determinate sensations like those which memory recalls—confused objects, or vague sounds, &c. are frequently only seen or heard: 2d, With many, however diversified or rapid the succession of ideas engaging the imagination, the illusion continues limited to one sensation, and is always reproduced in the same form; the patient always sees the same object, hears the same voice, or inhales the same odour: 3d, The delirium of the insane depends, in many cases, upon false sensation. All the wanderings of the mind are only the consequences of this. When patients recover, they say, "I have seen and I have heard as distinctly as I now see and hear you," while at the same time they are able to give an account of the errors of their imagination: 4th, In some insane persons, the hallucinations have preceded the delirium, and have been recognised by the patients themselves at the commencement as false perceptions; but at a later period, when combined with intellectual derangement, they have been regarded by them as real: lastly, One sometimes finds, in cases of hallucination, changes of the nerve destined to convey impressions; and although it may not be readily conceived how an alteration of the optic nerve, for instance, determines false perceptions relative to vision, it cannot be more easily explained wherefore disease of a nerve of motion in neuralgia causes involuntary movements of the muscles; we may as well believe that alteration of the nerve is the true and sole cause of the hallucination, although in the healthy state the will may be the only cause of voluntary motion, as that external excitants, the impressions on the organs of sense, are, in health, and during waking hours, the only natural cause of all sensation and of all perception. There is, besides, this analogy between the two cases,—that neuralgia of a nerve of motion does not ordinarily bestow the influence of the will on that nerve, and by consequence upon the muscles, and that the alteration of a nerve of sensation giving rise to hallucinations does not destroy the perception of sensorial impressions, although it often disturbs and impedes them.

17. It is much better supported by close observation and *post mortem* research, and hence much more probable, that illusions or hallucinations arise from lesions of the nervous parts intermediate to the organs of sense and the centre of perception, or from alterations of the parts of the brain into which the nerves of sensation enter, or in which they terminate. Illusions similar to those which occur in the insane, sometimes take place in persons whose intellects are sound; but a healthy understanding appreciates the false perception correctly, whereas the disordered mind confounds them with realities. It may hence be inferred that they are the effects of lesions which do not necessarily or constantly implicate the understanding, but which more frequently, owing to intensity or extent, affect the intellectual faculties, and especially the powers of attention and reflection.

18. Whatever may be the point of organic departure of hallucinations, they are lively or sad, capable of inspiring sentiments of benevolence, or of arming the hand of the maniac with an instrument of homicide. The supporters of the doctrine

of GALL suppose that the characters they assume entirely depend upon the portion of the brain affected — upon the point in the organ whence they proceed. The effects, however, of hallucinations upon the minds of the insane are undoubtedly as real and as positive as the impressions produced by external excitements.

19. *C. Delusions or false perceptions connected with the general sensibility.*— These disorders, from the most simple and circumscribed to the most general and complicated, are constantly met with in mental diseases. Persons who believe that they have in the belly, or in the chest, or in the head, an animal which preys on them, are as much the subjects of disordered sensations as those who say that they are without a stomach, or a heart, or head, and who otherwise are tormented by the most strange feelings. Those who believe that they have the devil in their bodies are victims of morbid sensations, which their disordered mental faculties refer to this cause. In many cases the delusion, false perception, illusion, or whatever else this kind of symptom may be called, evidently results from a state of suffering — from disease in the parts to which the delusion is referred. They are, in fact, symptoms dependent upon local lesion, traces of which are generally discovered on examination after death, the morbid sensation being misinterpreted by the erring judgment of the patient. M. FOVILLE justly remarks that, without the state of pain, or morbid sensation, occasioning the delusion, the delirium of the insane might take another direction, and might be more easily appeased; and that one of the most efficacious means of attaining this object is to remove, when this can be done, the pains or sensations which give rise to the delusion.

20. In some instances, the delusion is unattended by any appreciable disorder of the part to which it is referred. It may depend, judging from analogy, upon an alteration in the nerves conveying impressions made in parts which they supply, or to which they are distributed; or even in those which are connected, or sympathise, with a disordered structure. The well-known example of pain referred to parts removed by amputation may be adduced in support of this view. — From what has now been stated, the delusions depending upon the general sensibility may be divided into — 1st, Those which seem to proceed from some alteration or lesion of the parts to which they are referred; and, 2dly, Those which seem to depend rather upon the state of the nerves transmitting the sensations, or upon the nervous centres themselves, than upon any appreciable lesion of the parts which are the seat of the delusion.

21. *a. Delusions with lesion of the parts to which they are referred.*— Many instances of this kind of delusion have been mentioned by authors. M. ESQUIROL states, that in one of his patients there existed considerable tension of the abdominal muscles, with tenderness of the abdomen. The devil, the patient said, had placed a cord from the pubis to the sternum, and a demon in her body, which burned, pinched, and bit her heart, and tore her entrails. Amongst other alterations found after death, the usual changes consequent upon chronic inflammation of the peritoneum and pericardium were found. Here the relation between the symptoms of the physical change and the mental delusion is sufficiently manifest. The same writer, amongst other instances, mentions the case of a female who believed that she had no longer any body, and that it had been carried away by the devil, for she felt nothing. M. ESQUIROL inserted a pin under the skin of her arm, without causing any evidence of pain. The loss of sensibility was evidently in this case connected with the production of this particular delusion. Another female fancied that the devil lay with her: she had constant pain and tenderness in the region of the uterus; and these were doubtless connected with the origin of the insane idea. There is here a very evident similarity of these delusions to the false perceptions attending disease of an organ of sense. All these morbid sensations are correctly judged, and their real natures appreciated, by the sane mind; but the disordered intellect is unable thus to recognise them, variously transforms them, and contemplates the forms into which it changes them, as real existences; superstition, previous habits and occupations, predominant feelings and religion, severally imparting to them the shapes which they assume, or the colour and character which they present. Similar to the above instances is one mentioned by M. FOVILLE. A man, who received a severe wound at the battle of Austerlitz, continued insane ever since. His delusion is founded on that which he no longer recognises; he has lost the sensibility of the surface; and he believes that he no longer exists. He says, that that which you see there is not he; that it is a machine which has been made to resemble him, and which is very badly made. This man often falls into a state of complete immobility and insensibility, which last several days. Vesicatories and sinapisms never produce the least signs of pain. He often refuses to eat, saying that the machine which has replaced him has no belly, and that it has no need of food. His external surface and extremities evince no sensibility. The strange delusion which this patient labours under is manifestly founded on the loss of sensibility in these parts, and on the absence or marked modifications of organic sensibility.

22. *b. Delusions connected with the general sensibility that are independent of alteration of the parts to which they are referred,* seem to be more rare than those in which some lesion or other exists. It is the reverse in regard of false perceptions connected with the special sensibility — with the organs of sense. Not infrequently, however, these different kinds of false perception — of delusion and hallucination — are associated in the same case. The delusions of most insane persons have more or less reference to, or are influenced by, their education, their habits, their prejudices, their studies, their fears, &c.; and are often attributed by them to sorcery, to demons, to various physical causes, &c. A weak superstitious person believed that he had the devil in his belly. For a long time he could not make out how he got there; but he at last fixed upon the idea, that his father sold him to the devil in the presence of a notary for a sum of money. Just before he was taken ill, this young man accompanied his father to a notary, where they met a stranger who paid the father some money. This was in hot weather, and, on leaving the notary's office, the young man took some glasses of bad cider, and

complained soon after of pains in the abdomen, which have since continued to afflict him; and it was upon this circumstance he based his delusion.

23. Too great importance cannot be attached, in the practice of mental disorders, to the various lesions of sensibility, or too much attention paid to false perceptions and delusions of all kinds, both as respects their connection with physical lesion, and as regards their consequences, or influence upon the subsequent course of the malady. It is very manifest that the patients, who are the most dangerous to themselves and to those who are about them, are those who are subject to some one of these false perceptions or delusions. One insane patient hears a voice, which says to him, kill him or them. He resists the impression for some time; but at last believes it to be a supreme command, and obeys it. Another has recourse to suicide, either to avoid the punishment or distress of these hallucinations, or in obedience to orders, which he believes he has received from the Almighty, and which he is bound to execute. There is much more reason to distrust a maniac, who is subject to delusions or hallucinations, and to exercise strict control over him, than one who is not so afflicted.

24. All the foregoing kinds of false perceptions require also very close observation, especially with reference to their physical relations, — to the states of the organs to which they are referred, — in order that appropriate methods of treatment should be employed. It is obvious that, if the delusion be founded upon, or in any way connected with, functional or structural lesion, means should be used to remove such lesions; for, as already shown (§ 19.), organic disorder either occasions, or perpetuates, or aggravates, the morbid sensation, which the deranged mind perceives or construes falsely.

25. *c. Various other lesions of sensibility are often observed.* — Insane persons often tear themselves with their teeth or nails, without manifesting the least pain. Some eat straw, grass, &c.; some even their own excrements; and others gnaw their fingers or extremities. Patients have, in a few instances, picked or scratched parts of their own bodies, until large cavities or holes have been thereby made (Esquirol, Foville, &c.). Some possess a remarkable power of bearing, without suffering, extremes of heat and cold. Some authors allege this to be general among the insane, but this is an error: the greater number do not manifest any sensible difference in this respect from the healthy. Others deny this altogether; but it is certain that many insane persons bear, without appearing to suffer, and without feeling the least inconvenience, the most excessive cold. Currie, Rush, Esquirol, Foville, and others, cite numerous instances proving this circumstance, — not the least coryza, or catarrh, or complaint whatever, having followed the exposure to cold. Some patients can fix their eyes upon the most intense light, and even upon the sun, without being dazzled thereby. M. Foville adduces several instances, where vision was by no means weakened by having the eyes fixed for some time upon this luminary, in the month of July; the patients being able to read, immediately afterwards, a book printed in very small characters. Most insane persons readily addict themselves to the use of tobacco. They smoke, chew, or snuff it with avidity — females as well as males — when they can obtain it.

26. ii. Symptoms appertaining to the Moral, Intellectual, and Instinctive Manifestations of Mind. — The disorders of these manifestations are as numerous as the possible combinations of our ideas, and as diversified as our passions, propensities, prejudices, affections, and education. They present themselves under two forms: in some cases they have reference only to a single train of ideas; in others, they comprise a greater number. It is especially to this class of symptoms that the French pathologists have applied the term *delirium* — the disorder of the mental faculties forming with them the delirium of the insane; and upon the limits or extent of this disorder has been founded the division of intellectual derangement, or of the delirium, into partial or exclusive, and vague or general. The mental disorder, moreover, may be evinced chiefly in the moral, or in the intellectual, or in the instinctive, manifestations, or it may extend itself much more generally. It is according to the nature and extent of the disorder, that arrangements of mental diseases have commonly been attempted. In the one class, whatever may be its limits or extent, there is only a perversion, or an aberration, of the faculties; in the other, the faculties are altogether lost or obliterated; and this privation is either congenital or primary, or accidental or acquired. "Who is there," says M. Esquirol, "who can flatter himself to have observed, and to be able to describe, all the symptoms of mania, even in a single individual?" It is particularly to the very extensive class of symptoms now under consideration, that this reflection is applicable. How are we, observes M. Foville, to comprehend the fugitive and multiplied shades of general delirium? How are we to trace the infinite subtilties of partial delirium, or monomania? In *general delirium*, or *maniacal* and *incoherent insanity*, ideas the most extravagant, images the most fantastical, associations the most discordant, emotions the most opposed, succeed each other with electric rapidity. The maniac confounds in his mind heaven, earth, and hell, his domestic affairs, his affections, politics, and morals. He speaks in verse, sings, laughs, weeps; utters his sentences with marked or peculiar emphasis; he speaks by turns in all the languages he may know; retraces his steps, lifts or extends his hands or tosses them right and left; dances, jumps, and utters menacing cries; rushes on his companions, tears all that comes in his way; strips himself naked, rolls on the ground, &c. &c. In these cases the functions of mind are not destroyed, but they are morbidly excited — they are actively deranged — and are no more like their healthy condition, than convulsions resemble the quiet walk of a man in health. On the other hand, in *partial insanity*, or monomania, the mind is concentrated upon one object or train of ideas, whatever it may be. The patient displays infinite resources to justify his error, and applies the most imperturbable attention in pursuit of it.

27. Disorders of the passions, and more especially of the intellectual faculties, particularly characterise general or maniacal insanity; disorder of the affections chiefly mark partial insanity, the intellectual faculties being but little affected. It is in the former that the greatest

agitation is observed, many patients vociferating day and night, until their voices become, in a short time, so altered, that, in spite of their efforts, they cannot be heard at the distance of a few paces — a species of *aphonia*, peculiar to the maniac. Although this aphonia is partly caused by the efforts to cry, still it seems to be in some degree owing to the state of nervous influence, for some patients evince it from the very accession of their malady. Some maniacs present the peculiarity of repeating all their actions, questions, or expressions, or even their discourses, a certain number of times. The simple repetition of these acts or expressions has been referred to a want of harmony in the action of both hemispheres of the brain; but the repetition is sometimes oftener than once.

28. Amongst maniacs are found instances of erotic excitement, of an exaltation of parental or filial affection, or of the ties of friendship. Some are ferocious, others quarrelsome, others have a propensity to murder, or to steal; and many are remarkably cunning and deceitful. All large establishments contain maniacs of pride; princes, sovereigns, great dignitaries, and even gods themselves, are not rare. Vanity is observed in all its extravagances, furnishing the best lesson to the vain fools who strut their hour on the stage of modern society. Here are found patients a prey to the most distressing anxiety, to the utmost mental agony; seeing in the present and in the future nothing but despair, imploring death, and desirous of inflicting it upon themselves, in order to escape from their miseries. Some dream of nothing but change, of distant journeys or voyages; others have lost their memory of persons or of things; and several, particularly during the exacerbations of the disease, can no longer speak their own language, but give utterance instead to confused and fantastical sounds, delivered in the tone of a continued discourse. Painters, musicians, and artists of all kinds, appear among those whose education has not been directed to the arts; and even poets, or, at least, rhymers, spring up amongst those who even have not learnt to read. Visionaries of all kinds abound; some apply themselves incessantly to the solution of the greatest problems of nature, or of the most difficult questions in metaphysics, religion, politics, political economy, &c., although uneducated; and prophets, saints, and martyrs are not uncommon.

29. Ought it to be inferred from all these varieties, as regards the intellectual disturbance, that each of them is connected with an isolated and distinct lesion of a particular part in the brain? Ought we, in the present state of our knowledge, to admit that the organ of the understanding is composed of an assemblage of particular and distinct organs for each propensity, and for each endowment? Ought we, in fact, to adopt, to its full extent, the psychological system, according to which these questions are answered in the affirmative? It would be out of place here to discuss the real value of a psychological system; but it becomes necessary to notice the assertions of those authors who maintain that, in partial insanity, particular forms of the skull correspond with the varieties of the mental affection; that they are able even to trace the propensities, the talents, dispositions, and dominant ideas of their patients. However, impartial observation of the insane, as M. Foville very justly remarks, does not confirm the accuracy of these assertions. This writer, whose experience is most extensive, and powers of observation very great, states, that it is certain, that the same partial delirium, in many patients, corresponds to opposite forms of the same part of the skull. In some religiously insane, he has found the superior and middle part of the cranium remarkably developed, whilst, in others, the same portion was much below the ordinary magnitude. The insane who suppose themselves kings, emperors, princes, &c., are far from presenting, generally, a marked development of the regions of the organs of ambition, domination, vanity, &c., as assigned to them in the system of Gall, but are often inferior in this respect to those who pass the whole day in sweeping or cleaning the courts, &c., or who are most interested in the most menial occupations. If there exist distinct organs for every faculty or propensity, it is not necessary, I admit, that their development should be at all extraordinary, in order that irritation or inflammation should excite their activity, or occasion prominent or peculiar phenomena as respects them. But it may be stated, at once, that we often find, in cases of partial insanity, lesions as extensive as in those where the mental disorder was general; and that we occasionally observe instances of partial delirium, that cannot be the result of the excessive, or of the irregular, exercise of any fundamental faculty, or of vascular disorder limited to any particular part of the brain, to which such partial affection may be referred, even by those who espouse the doctrines in question. To the lesion of what fundamental faculty does the insane notion of a man correspond, who believes himself changed into a woman, *et vice versâ?* or of a person who believes himself transformed into a dog, assumes his habits, barks like him, walks on all fours, bites, &c.?

30. It may be truly said of partial insanity, that whatever, in the course of a man's life, may be to him an object of a particular regard or propensity, of a distinct taste, of a ruling passion — all the bizarre or fantastical ideas which his mind may entertain, may, in a state of disease, become the subjects of his delirium or hallucination; that many delusions — many forms of partial insanity — cannot really be referred to lesion of a particular faculty, or of that portion of the brain which has been considered the origin of such faculty; and that, in short, where it appears reasonable to refer them to an alteration of this kind, attentive examination of the conformation of the skull is far, in the majority of cases, from corresponding to the assertions of the authors of the psychological system in question. It must not, however, be inferred from what has just now been advanced, that attentive observation of the forms of the skull of the insane is of no use; on the contrary, a regularly developed cranium, of a reasonable size, ought, *cæteris paribus*, to assist an opinion, as to the possible issue of the disease, very different from that inferred from a small, confined, and deformed skull. What has been stated applies only to the assumed seats of fundamental faculties, exclusively or principally affected in certain patients. In short, the disorders of the intelligence in the insane are partial or general, as regards the intellectual faculties, properly so called, and likewise in respect of the passions and affections.

31. In a very great majority of cases the insane are unconscious of the state of their minds, and are offended at being considered mad. They even accuse those of insanity, who do not admit the integrity of their intellects. Some, on the contrary, are conscious of being deranged, but are unable, nevertheless, to correct the aberrations of their reason. These rare instances show what benefit may be expected to result from attempts to convince an insane person that he is deranged.

32. iii. THE SYMPTOMS FURNISHED BY THE LOCOMOTIVE ORGANS. — The disorders of voluntary motion in the insane may be divided into — 1st, Those which are temporary and local; and, 2dly, Those which are persistent and general. — *a.* In many, the movements become remarkably vigorous and energetic; an irresistible inclination to run, jump, gesticulate, &c. manifesting itself, produced by the general irritation, which occasions the mental affection. These, however, cannot be regarded as important or specific alterations; but sometimes, during the paroxysms of the alienation, the muscles of the face, or of an arm, or of a leg, are agitated by *irregular movements, like convulsions,* which are strictly local, are very distinct from the general convulsions of epilepsy or hysteria, and resemble the involuntary movements attending neuralgia. These irregular and convulsive actions of the muscles of a single part or limb are met with chiefly in the intermittent or paroxysmal forms of insanity, or in exacerbations of the disease; and are evidently dependent upon the morbid condition of the brain, from which the paroxysms or exacerbations of mania result. They are only occasionally observed, and were first described by M. FOVILLE.

33. *b.* An incomplete and *peculiar form of Palsy* is much more common in the insane than the foregoing local convulsive action, and is even much more serious. It is not mentioned by the older writers, and it is but slightly noticed by PINEL. M. ESQUIROL has studied it with much care, and especially with reference to the ulterior progress of the mental disease. More recently, MM. DELAYE, BAYLE, and CALMEIL have investigated it still further. This affection, usually designated the paralysis of the insane, and general or incomplete palsy, consists of a general and gradual loss of power in the voluntary muscles. It commences with an embarrassment of the motions of the tongue, or with indistinct articulation. Patients hesitate for a time at some syllables, which they overcome only by an effort. They are unable to pronounce some letters, — the R, for instance, — or they express them with difficulty. Afterwards a similar embarrassment is observed in the movements of the arms, legs, &c.; and lastly, in all the muscular system. The disorder possibly commences as early in the muscles of the limbs as in those employed in articulation; but as these latter require a greater precision of action for the due performance of their functions than the former, they more readily betray the incipient disorder, and this disorder is thus more early brought to the notice of the physician.

34. It requires, however, some experience to enable the physician to ascertain the commencement or earlier grades of this affection. When it has made some progress, the diagnosis is easy. The embarrassment of pronunciation is then very sensible. The patient cannot speak without throwing all the muscles of the face into action. The walk is vacillating; the motions of the arms and hands are unsteady and awkward,—and these last constantly tremble, and are incapable of retaining a determinate position. It is not, however, as yet, the force, so much as the precision, of the movements that is impaired. A patient may squeeze any object with much power, but he cannot execute any delicate work, or even button his own vestments. In attempting to run, his course is irregular, or attended by deviations to the right and left, like to an intoxicated person; he exhibits the appearance of suppleness, but a state of morbid tension exists in all the muscles of the trunk, extremities, head, and face; he comes awkwardly down on the soles of his feet, his arms are extended, the eyelids are widely open, the jaws firmly closed. Sensibility becomes blunted, so that irritation of the skin is not perceived until after some time. The paralysis of the insane is often more marked on one side of the body than on the other; but sometimes the progress of the affection varies, or even alters materially in either side.

35. *c.* If this complication be observed with attention, *two distinct stages* may be recognised: — In the *first*, the movements, although uncertain, retain a certain vigour — a rigidity of action, rather than power. This gives way, after a time, to the *second,* — to a relaxation — or a state of resolution, always increasing, of the muscular system. The patient becomes incapable of exertion; the features sink; the eyelids open sluggishly; the eye is dull; the jaws fall; the lips are pendant; and the excretions are involuntary. The patient is incapable of retaining a favourable position, and at last lies prostrate; the parts pressed upon by the weight of the body being excoriated, and ultimately gangrenous. In the course of this state of disease, attacks of cerebral congestion, followed by convulsions and coma, which continue for many hours, and are frequently repeated for several successive days, are often observed. After these attacks, the intellectual debility and aberration, and the paralysis, which are generally coordinate, are much more prominent. In many, variable periods, during which the symptoms are stationary, are interrupted by seizures of this kind, after which the malady proceeds rapidly, without ever retrograding, until the last degree of intensity is reached.

36. In the great majority of those who experience this complication, the paralysis does not commence until after the appearance of the intellectual disorder; but in some the insanity and palsy appear simultaneously; and in a few the muscular affection precedes the mental derangement. It should, however, be kept in recollection, that a general paralysis, similar in all respects to that now described, occurs, in rare instances, without being followed by insanity. I have seen several cases of this kind; and the circumstance has likewise been noticed by MM. DELAYE and FOVILLE.

37. iv. THE PHENOMENA EXHIBITED BY THE ORGANIC FUNCTIONS. — These functions present but little that is determinate, although they are rarely observed in a truly healthy state. Digestion is usually disordered in the earlier periods of insanity. The appetite is deficient or altogether lost; and more or less thirst is present. The mouth is clammy, and often dry; the tongue is white, with the papillæ often erect, or it is loaded

or slightly furred, or covered by a slimy mucus. It is often red at its point and edges. The salivary secretion is commonly scanty or frothy, but in a few instances it is increased, or frequently rejected. The *bowels* are more or less constipated, and the *urine* somewhat coloured. These symptoms very often disappear under an appropriate treatment, the mental disorder continuing even without material change; and the appetite returns, or is even increased. Sometimes the appetite is excessive from the commencement, although the other symptoms just mentioned are all present. Costiveness is the most general and persistent symptom, often continuing through the whole course of the malady.

38. The *pulse* is sensibly accelerated in the majority of cases. Authors have erred remarkably — even recent writers copying the blunders of those who have preceded them — in saying that the disease is unattended by any disturbance of the pulse. RUSH found the pulse affected in seven eighths of his cases; and M. FOVILLE observed a large majority of cases of uncomplicated insanity, with more or less acceleration of pulse, the mean pulsations in those examined by him being 84 in the minute. In comparatively few the pulsations were under 70, and in none were they below 60. The *heart's* action is attended by increased impulse in the majority of cases; and in a few it is tumultuous, irregular, or even intermittent. In some it is weak, and almost inaudible, or insensible to the touch. Organic change of the organ, in some one or other of its numerous kinds, is very common, especially in old cases of insanity. M. FOVILLE states that he found some alteration or other of the heart in five sixths of the cases of insanity that he had examined after death during three years. But these changes are accessory, or not necessarily connected with the mental disorder: they are even, in many cases, produced by it.

39. v. ACCESSORY SYMPTOMS. — In all recent and acute, as well as in all prolonged cases, in which the symptoms have retained or assumed an acute character, obstinate *insomnia* is generally present. I have seen it often precede the mental disorder; and where the insanity presents an intermittent or paroxysmal form, it attends the accessions. This symptom is frequently most remarkably obstinate and prolonged; insane patients sometimes passing weeks or even months without the least sleep. When sleep is obtained, it is disturbed, dreaming, or wandering, or even raving. As to the symptoms furnished by the external aspect of the body, but little can be stated, as they vary with the habits and conditions of the patients, and the stages of the malady. In the great majority of cases, the expressions of the countenance correspond with the nature of the ruling passions, which manifest themselves with so much the more energy and truth, as nothing counteracts their operation. The eyes are unfixed, unsteady, wild, or timid, and incapable of returning a determined or steady look. The conjunctiva is injected, and the conchæ of the ears more or less red. The cheeks are not always coloured similarly to these two parts; for they may be either pale or red, or livid, whilst these present the highest degree of vascular injection. The skin is hot and dry, or hot and moist. The heat is greatest and most constant over the forehead, the extremities being frequently at the same time cold.

40. The co-existence of some important affection of the digestive, circulating, and respiratory organs with insanity sometimes imparts to the latter a modified or intermittent form. It is not rare to see phthysis breaking out during the progress of the mental disorder, and suspending it for a time. The patient in this case recovers his reason, whilst the pulmonary disease makes progress: but if this progress is arrested, the insanity returns; and these alternations often succeed each other until death takes place. Frequently an acute disease supervenes upon, and interrupts the course of, insanity, which reappears in all its severity after the accidental omplication has subsided. M. FOVILLE thinks that this effect is oftener produced by acute inflammations of the chest than by those of the abdominal viscera. And lastly, an acute disease, thus occurring in the course of the mental affection, sometimes entirely suspends the latter, and is followed by complete recovery.

41. On passing in review the principal symptoms of mental alienation, disorders of the intellectual and moral powers only will be found constant. These disorders will often exist in persons whose sensations and movements are performed as regularly as in health; but they will also be frequently associated with morbid sensations, false perceptions, and delusions. In this latter case the conversation and actions of the insane will be as much the results of these sensations and perceptions, as the discourse and actions of reasonable persons are the results of external circumstances and rational inferences; the intellectual disorder then truly appearing to be chiefly the consequence of the affection of sensation and of perception. Where the mental alienation is associated with disorder of the voluntary movements, the connection between both is very different from that existing between the former and the sensations and perceptions. The voluntary movements are disordered as a contingent consequence of the lesion of the brain, that either is caused by, or occasions, the mental disorder; and are hence merely a complication, but one indicating a hopeless state of the malady. Lesion of voluntary movements, as described above (§ 32.), may, in rare cases, exist without insanity, but is generally consecutive upon, and an occasional complication of, disorder of the perceptions, or of the intellects, or of both the perceptions and intellects. This complication, moreover, merits the strictest attention in practice; for, where it exists, the perceptions and faculties are not merely simply perverted, but are, with the sensations, weakened, or even blunted. The memory is impaired; and association of ideas, whether true or false, is no longer vigorous. The affection of the intellects assumes an analogous state to the disorder of voluntary motion; the mental powers, as well as the muscles of volition, are universally weakened, and ultimately paralysed.

42. It is evident that the proportion of cases in which the mental disorder is simple, and of those in which it is associated with lesions, either of sensation and perception, or of motion, or of both, must vary with the numerous circumstances connected with the predisposing and exciting causes, and with the duration and treatment of the malady; that the proportion of each class in lunatic establishments, especially, will vary with the regula-

tions by which they are governed, and particularly with the restrictions as to the kind of cases admitted, the duration of the malady previous to admission, and the continuance of the patient under treatment. On this point, therefore, no precise information can be adduced. M. FOVILLE, however, states, that in an institution containing 334 insane persons, of whom 144 were men and 190 women, he found 214, of whom 94 were men and 120 women, presenting intellectual disorder without complication; 89, of whom 34 were males and 55 females, manifesting various disorders of sensibility; and 31, of whom 22 were men and 9 women, labouring under general paralysis. According to this account, the number of cases of simple intellectual insanity is the most considerable; the proportion of cases associated with deranged sensibility and perception, somewhat greater in females than in males; and the number of those complicated with general paralysis, was much greater in men than in women.

43. II. ARRANGEMENT OF MENTAL DISORDERS. — It is not more easy, satisfactorily to arrange the disorders of mind, than, in many instances, to determine the presence of disorder, and especially of that which is more strictly moral, the existence of which, if not always questioned, has been very generally overlooked, until contended for by a few recent authors.

44. The ancients divided insanity into *Mania* and *Melancholia*. By mania they understood a general delirium, and by melancholia a partial delirium. This division has descended down to a recent period, receiving, from time to time, some modifications, which have not prevented its being still adopted by some modern writers.

45. M. PINEL arranged mental diseases into — 1st, *Mania*, which he defines a general delirium with agitation, irascibility, and a propensity to furor; 2d, *Melancholia*, or exclusive delirium, with debility, moroseness, and a propensity to despair; 3d, *Demency*, or a particular debility of the operations of the understanding, and of the acts of the will; and, 4th, *Idiotism*, or a sort of stupidity more or less marked, with a nullity of character, and a most limited circle of ideas.

46. Dr. RUSH, in his excellent treatise on diseases of the mind, divided them into *partial* and *general*. He subdivided the *former* into — 1st, *Tristimania* (hypochondriasis and melancholia), in which a person entertains false ideas respecting his person, his affairs, and his condition, whereby he may be plunged in despair; and, 2d, *Amenomania*, in which the delirium is lively. The *latter* he subdivided into — 1st, *Mania*, or violent general delirium, with propensity to furor; 2d, *Manicula*, or a milder form of the preceding, or a chronic state of it; 3d, *Manalgia*, or a general torpor of the body and mind; 4th, *Dissociation*, or a state similar to the Demency of *Pinel;* and, 5th, *Fatuity*, or a condition generally denominated Idiotism by French nosographists.

47. M. ESQUIROL arranged mental disorders into — 1st, *Mania*, general delirium; and, 2d, *Monomania*, partial delirium. The term monomania conveys a clearer idea, and one more applicable to the diversity of cases of partial insanity, than the word melancholia. He applies, with great propriety, the term *idiotism*, or idiotcy, to congenital abolition of the mental faculties, and that of *dementia*, or *demency*, to accidental loss of them. M. GEORGET, adopting the division of ESQUIROL, added a fifth species, consisting of acute dementia, described by the latter as a variety only.

48. GALL endeavoured to connect the states of partial insanity to the respective fundamental faculties into which he divided the manifestations of mind. His pupil, SPURZHEIM, whilst he kept in view the doctrines of his master, admitted four states of insanity: viz. idiotism, dementia, alienation, and irresistibility.

49. Dr. M. BURROWS, extending the signification of the word insanity beyond most of his predecessors, has divided it into — 1st, *Delirium — delirium tremens;* 2d, *Mania — puerperal mania;* 3d, *Melancholia — suicide;* 4th, *Hypochondriasis;* 5th, *Demency*; and, 6th, *Idiotcy*. He observes "that delirium and hypochondriasis have better claims to be considered as distinct species than mania and melancholia. It is true that, if delirium be received only in its ordinary acceptation, as symbolical of intellectual disorder, it does not merit the rank of a distinct malady. But I think that there is ground to consider it as a frequent idiopathic affection, though certainly much more generally as sympathetic, and often as symptomatic." On this topic it is unnecessary to offer any remarks, or to do more than to refer the reader to what I said when discussing the *diagnosis* of DELIRIUM and HYPOCHONDRIASIS.

50. Professor HEINROTH has furnished a very elaborate arrangement of disorders of the mental faculties in his able work. He considers the derangements of the mind to be limited in number and in kind only by the diversities of the mental manifestations; and he bases his classification of these disorders upon two distinctions: the *first* is the difference which consciousness shows to exist in our mental operations; or which exists between — 1st, the feelings or sentiments; 2d, the understanding or reasoning powers; and, 3d, the will. The emotions of joy, grief, pleasure; the processes of reflection and contemplation; and the acts of the will or of self-determination; are *three* kinds of mental phenomena, which he considers to be so clearly distinguished from each other, as not to be confounded. According, therefore, as the cause of insanity is in relation to one or other of these kinds of mental manifestation, or as the disorder refers itself to either of these, or as it affects the feelings, the understanding, or the will, so it is placed in his classification, which consists of three classes of mental disorders, corresponding to these three departments of mental operation. The *second* distinction is derived from the character of the disturbance — whether it is that of exaltation or depression — of increased or diminished excitement or action.

51. Conformably with these bases of arrangement, the FIRST DIVISION consists of *disorders of passion, feelings, affections, and moral dispositions:* and presents *two forms*, viz. 1st, Of *exaltation*, or excessive intensity, giving rise to undue vehemence of feeling and morbid violence of the passions and emotions; and, 2dly, Of *depression*, or simple melancholy, or dejection without illusion of the understanding. The SECOND DIVISION comprises *disorders of the understanding or intellectual faculties*, consisting of two forms, the first of which is characterised by *exaltation*, or undue intensity of the imagination, producing mental illusions, or the several varieties

of monomania; the second, by *depression*, or feebleness of conception of ideas — by imbecility of the understanding. The THIRD DIVISION consists of *disorders of the voluntary powers*, or of volition and the propensities; — the first form of which is characterised by *violence* of will and of propensity, or madness without lesion of the understanding; the second, by *weakness* or incapacity of willing, or moral imbecility. To these unmixed forms, Dr. HEINROTH adds, under each division, others displaying combinations of several simple varieties. Thus, exaltation of feeling and of imagination constitutes derangement of the understanding with violent excitement or raving madness: delusion, with depression of feeling, constitutes insanity, with sorrowful dejection, or melancholy, &c.

52. M. GUISLAIN, in his first able work on mental alienation, adopted, with very little change, the arrangement of PINEL. But in his more recent treatise, he has taken a more comprehensive and more original view of morbid mental affections, upon which he has bestowed the name *phrenopathies*, and which he has considered to proceed from an *exaltation*, or an *aberration*, or an *oppression*, or even from *exhaustion*, of the cerebral energies. These are the *four pathological conditions*, which he views as the *efficients* of mental disorders; and he arranges them as follows, — comprising, however, several affections not usually included amongst mental diseases, although sympathetically, or even more intimately, deranging the manifestations of mind: —

53. i. *Melancholia* or *Luperophrenie* (from λυπηρὸς, sad, and φρὴν, the mind), which he defines to be an exaltation of the feelings and sentiments to a state of sadness, and which he considers to exist at the commencement of almost all cases, and, with lesion of the sensibility, to constitute the fundamental character of insanity, appearing as one of the more important features of the malady. It frequently, however, assumes a monomaniacal, or, as he more correctly terms it, *monopathic*, form (from μόνος, single, and πάθος, disorder).

54. ii. *Mania*, or *Hyperphrenie* (from ὑπὲρ above, and φρὴν), which he views as a state of cerebral reaction, in which the whole or some of the active manifestations of the intellect, or traits of the character, or propensities, &c. are remarkably exaggerated and disordered. This species of insanity presents two states; — that of *erethism*, or tranquil mania; and that of *orgasm*, or furious mania. It may be partial — *monopathic*, or *monomaniacal*; or more or less general, as respects the extent to which the instinctive, intellectual, and moral powers are implicated. It may thus appear in the shape of ambitious, religious, lascivious, covetous mania, &c., assuming either a tranquil or a more or less furious character. The different forms of this species may be *associated* with *melancholia*, constituting *melancholic mania*.

55. iii. *Madness*, or *Paraphrenie* (from παρὰ, along with, and φρὴν), which he defines to be cerebral reaction characterised by fantastic aberration. This species presents numerous varieties and modifications as to the extent and association of mental disorder. But it is frequently partial or monopathic, and it may be either of a harmless or destructive nature. It is often *associated* with *melancholia*, or with *mania*, or with *both*.

56. iv. *Extasis*, or *Hyperplexie* (from ὑπὲρ, above, and πλῆξις, astonishment), which he views as sub-convulsive reaction of the cerebral power, characterised by immobility and rigidity. This state, although often monopathic, is also frequently complicated with *melancholia*, or with *mania*, or with *madness*, or with any two, or even all, of these.

57. v. *Convulsions*, or *Hyperspasmie* (from ὑπὲρ, and σπασμὸς, violent contraction). This species M. GUISLAIN defines to be reaction, with muscular and mental agitation. He comprises under it tremor, convulsive syncope, chorea, hysteria, and epilepsy, — disorders previously not similarly classed, although either of them often *complicates* one or more of the mental disorders already enumerated, and even all of them, in rare instances.

58. vi. *Delirium*, or *Ideosynchysie* (from ἰδέα, idea, and σύγχυσις, confusion), which he states to be reaction and aberration of the ideas, wandering of the intellects, illusions, hallucinations. This may be *monopathic*, as when the patient is possessed by a single idea or illusion; or it may be *associated* with one, or more, or even with all, of the mental affections just noticed.

59. vii. *Incoherence*, or *Rêvasserie*, or *Anacoluthie* (from ἀνακόλουθια, incoherence). This state M. GUISLAIN considers as different from delirium, inasmuch as in the latter the ideas run upon some illusion or hallucination, whereas in this state they arise vaguely, and without any connection with each other, or with any particular subject or object: nothing is expressed clearly or consecutively. In delirium, the idea, although false, presents some connection, or even the colours proper to it. Incoherence may be *monopathic* or *associated*; most frequently the latter; and the association may be with either of the preceding affections, or with several of them.

60. viii. *Dementia*, or *Nousthenie* (from νόος, intelligence, and ἀσθενία, debility). This state is viewed by M. GUISLAIN as one of mental prostration and incapacity, in which the mental powers are palsied. This species is made to comprise those forms of insanity which consist of various grades of imbecility, original or acquired — congenital idiotcy and senile fatuity. Like the preceding species, it is either *monopathic* or *associated*, more frequently the latter, in which state it is usually the consequence of chronic or greatly prolonged forms of the disorders already enumerated.

61. I have thus fully adduced M. GUISLAIN's arrangement of mental disorders, because it presents not merely a classification, but also an instructive analysis of them, especially when attentively considered in his own copious exposition. For practical purposes, and for the inexperienced practitioner it will be found deficient in simplicity: but coming as it does from one of the most experienced and ablest writers on mental alienation, it deserves our careful attention and our respect.

62. M. FOVILLE, in attempting a physiological arrangement of mental disorders, observes, that *three orders* of phenomena, sensations, intellectual combinations, and movements, succeed one another in the actions of the nervous system; and that three orders of symptoms, exactly corresponding, show themselves singly or combined, in mental diseases. In founding upon the existence of the symptoms of a single one of these orders, and upon the successive appearance of those of the other two orders, he hopes to have laid, not only a physiological, but also an ana-

tomical basis of classification for the principal divisions of mental alienation, inasmuch as he thinks it may be admitted, at least with the consent of many modern writers, that sensibility, movement, and intelligence have each their distinct organic seat, although dependent upon the same system.

63. As *disorder of the intellects* is the most constant, the particular instances in which it is alone present constitutes M. Foville's *first division*, which comprehends mania, monomania, demency, and idiotcy, without complication with false perceptions, or with any disorder of the muscular system. In the *second division*, he arranges all cases characterised by the coincidence of disorder of sensation and perception with derangement of the intellects; and, in the *third division*, he comprises those which manifest that disorder of the muscular system, usually denominated general paralysis, or the palsy of the insane. In this third class he also comprehends the epileptic insane, as well as idiots, whose limbs are wasted and paralytic.

64. Dr. Prichard has distinguished insanity into — 1st, *Moral*; and, 2d, *Intellectual*: the latter he has divided into — (*a*) *Monomania*, or partial insanity; (*b*) *mania*, or raving madness; and (*c*) *Incoherence*, or dementia. *Idiotcy*, or mental deficiency, he has considered as entirely apart from, or unconnected with, any form of mental alienation.

65. Dr. Mayo, in his *Pathology of the Human Mind*, divides primary mental disease into — 1st, *Perversion*, or insanity; and, 2d, *Deficiency* of the mental manifestations. He subdivides *Perversion* of mind into — 1st, *Moral* incoherency; and, 2d, *Intellectual* incoherency: and *Deficiency* into — 1st, *Brutality*, or absence of the moral faculty; and, 2d, *Imbecility*, or intellectual deficiency.

66. I shall not notice at greater length the divisions of the various forms in which mental disorder presents itself, that have been attempted by modern writers. Enough has been advanced to show the difficulty of the attempt, and to prove even (what many would endeavour to conceal) that one form of mental disorder gradually and insensibly passes into that more nearly allied to it, not only in distinct cases, but often also in the same individual: that, for instance, partial, may rapidly pass into general, insanity; that melancholia may quickly pass into mania, or mania rapidly lapse into melancholia, or that both may very frequently alternate; and that the more simple states of intellectual disorder may be soon associated with disorder of the sensations and perceptions, or be still further complicated with lesion of the movements, in the form either of general palsy, or of epilepsy, or even of both. Nevertheless, although even the most different forms of insanity more closely approximate than is generally imagined, still it becomes necessary to preserve and to recognise such distinctions between them as really exist, inasmuch as they furnish most important indications for moral as well as for medical treatment. In the division, therefore, which I shall attempt, I shall endeavour, at the same time, to point out close relations as well as obvious distinctions; and to follow the progress of mental disorder from its more simple, partial, and common forms, up to its more general and complicated states. Conformably with this intention, I shall take a brief view — 1st, of the Partial Forms of Insanity — (*a*) as evinced chiefly in the *moral manifestations* of mind, and (*b*) as affecting principally the *understanding* or *judgment*; — 2d, of the General Forms of Insanity — (*a*) in the state of *mania*, or raving madness; (*b*) in the states of *incoherence* and *imbecility*, or dementia; (*c*) in the state of *fatuity*, or annihilation of the powers of mind; — 3d, of Complicated Insanity — the insanity being associated (*a*) with *paralysis*, (*b*) with *epilepsy*, (*c*) with *apoplexy*, &c. — Connate and Puerile Insanity — *congenital privation of mind*, or *Idiotcy*, and *Puerile Imbecility*; Puerperal Insanity — *insanity during uterogestation, after parturition, and during lactation*; and Suicidal Insanity — *or suicide in relation to insanity*; will be considered in separate chapters of this article.*

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* The following *classification* of the manifestations and affections of mind, with reference to their influence in causing mental and corporeal disorder, was published some years ago by the author. It may be found of use in considering the different forms of mental disorder, especially in relation to their arrangement, to their causation, and to their moral management. This classification of the affections of mind is based upon the relations of the human species to the rest of the animal creation, especially in respect of those manifestations which are exhibited by the higher animals. The *Instinctive Desires and Feelings* form the First Class, as being the most generally extended; and the *Intellectual States* and the *Moral Emotions* constitute the Second and Third Classes, as belonging especially to man, and as furnishing him with a numerous class of ideas, which raise him above all other animals, which ennoble him in his social and moral relations, and which enable him to derive advantages from the past, to rationally enjoy the present, and to form the liveliest hopes, and even the firmest anticipations, of the future.

CLASS I. INSTINCTIVE DESIRES AND FEELINGS. — Strong and immediate incentives to action in the lower animals, but controlled by reason in man.

Order I. *Instinctive Feelings, tending to preserve the Individual.*

a. The *sensations* derived through the medium of the external senses contribute to the preservation of the individual, by showing him what is injurious, and by enabling him to supply himself with what his internal sensations or appetites indicate to be necessary to his existence. — *b.* The appetite for food and drink. — *c.* The desire of preserving the animal warmth. — *d.* The desire of repose. — *e.* The desire of place. — *f.* The desire of pleasure and the dread of pain. — *g.* The desire of continued existence.

Order 2. *Instinctive Desires tending to perpetuate the Species.*

a. Parental and filial affection. — *b.* The desires of sex. — *c.* Desire of society and social feelings, giving rise to mutual support.

The *sensations* and *desires* are most powerful incentives of volition. — The appeasing of the *desires* is necessary, not only to health, but even to existence. The inordinate gratification of them is most injurious to physical and mental health, — is amongst the most fruitful sources of disorder of both mind and body.

CLASS II. INTELLECTUAL POWERS, OR STATES OF MIND.

Order 1. *Powers of Consciousness, or the simple Intellectual States of Mind.* — Injurious to health, chiefly from their injudicious or excessive exercise.

a. Perception. — *b.* Attention — effects of protracted, to a single object, or train of investigation. — *c.* Conception — accurate or inaccurate views — their effects. — *d.* Memory. This last power is more or less concerned in a large proportion of the states of mind affecting the health.

Order 2. *Powers of Intellection, or the more active Intellectual States of Mind.* — The excessive exercise or misdirection of these is more or less injurious to mental and bodily health.

a. Simple suggestion or association of ideas. — *b.* Habit. — *c.* Imagination — its activity as influenced by the moral emotions of mind, sometimes beneficial, but oftener injurious to health. — *d.* Judgment, or reasoning. — *e.* Abstraction.

Order 3. *Ideas of Reflection, springing from the Exercise of the two former Orders of Powers.* — Rational incentives to action.

67. III. Of the special Forms of Insanity.— In the above general description, I have confined myself to the more obvious and fully developed states of mental disorder. It is necessary, however, that I should consider, in a more minute, yet succinct, manner, the specific forms in which aberrations of mind present themselves in practice, and more particularly those slight, moral, and partial states of disorder, to which I have as yet very imperfectly adverted.

68. i. Partial Insanity — *the simpler forms and slighter grades of mental disorder.* — Most authors have erred in viewing the more partial, or *slighter forms* of insanity, as consisting of derangement of one, or of a few, merely, of the intellectual or moral manifestations; or of a false perception, or delusion, by which the mind is constantly haunted, whilst the other faculties are unimpaired. I have already hinted (§ 3.) at the inaccuracy of this view; and stated that, although a single faculty or manifestation may be prominently disordered, or a single train of ideas be almost exclusively entertained, the other mental faculties are never in a healthy state, or very rarely retain their former energy. Conformably with this, the term, *partial insanity*, is not so applicable to the states of disorder about to be considered, as one which would imply a *slighter grade*, or a *simpler form*, of alienation. But as the former has been already employed by recent authors; and as it may be conveniently used, as implying slightness of grade, as well as an uncertain limitation as to extent; I shall retain it, and employ it synonymously with these expressions.

69. *A.* Moral Insanity— the *Monomanie sans Délire*, or *M. instinctive*, of M. Esquirol. — This state of mental disorder may be *defined* to be *a perversion of the natural feelings, affections, inclinations, temper, habits, moral dispositions or impulses, without any illusion or hallucination, the intellectual faculties being more or less weakened or impaired.* This state has been noticed by Heinroth and Guislain, and more fully by Dr. Mayo, M. Esquirol, and Dr. Prichard, in their recent works. Its earlier or slighter grades, however, have not generally been viewed as amounting to insanity; and, indeed, unless either the disordered manifestations, which I have just enumerated as constituting it, be remarkably prominent, or the intellectual faculties be much weakened or impaired, it cannot be really considered as amounting to mental derangement. Dr. Mayo has noticed, in his *Essay on the Relation of the Theory of Morals to Insanity*, a certain variety of it as belonging to insanity, and given it the name of *Brutality*. But in a more recent work he remarks, that further consideration has satisfied him, that to class it as such is loose and unphilosophical. He considers this as a distinct form of mental disease, especially in its fully developed or strongly marked form, and to be altogether distinct from the moral symptoms of insanity that occur at an early period of the disease, and that often afford, at that time, the only clue to its existence. By *Brutality*, — by the moral disposition to which this term may be applied, — he implies a destitution of principle; by *Insanity*, a perversion of tendencies and want of self-control. In the latter case, the patient cannot hear the voice of conscience; in the former, he has no conscience to hear.

70. The moral disorder, termed brutality by Dr. Mayo, is, however, only one of the modifications of moral insanity, comprised in the more extended definition which I have attempted to assign to this species of mental derangement, agreeably with the observations of Heinroth, Guislain, and Prichard; and is one arising

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a. Mental identity. — *b.* Time. — *c.* Power. — *d* Causation and truth. — *e.* Right and wrong. — *f.* Existence of a Deity. — *g.* Immortality of the soul. All these are seldom injurious to health, but are often beneficial in controlling the emotions and desires, in governing and directing the instinctive feelings, and in enabling the mind and body to resist the influence of injurious impressions and agents.

CLASS III. Moral Affections of Mind, *in which some of our Instinctive Feelings, as well as of our Intellectual Powers, are frequently more or less engaged.*

Order 1. *The Instinctive or simple Moral Emotions of Mind,* often sudden and violent incentives to action. When strongly excited, or much indulged, they are amongst the most influential causes of both mental and corporeal disease.

a. Anger, indignation, resentment, revenge — their effects upon health. — *b.* Sympathy — its effects. — *c.* Beauty, or deformity, — *d.* Love and hate, jealousy, domestic misery. — *e.* Pride, vanity, and humility — the liability of the former to lead to insanity. — *f.* Gladness, regret, sadness, and grief: — Grief from lost objects of affection — its effects — counteracted by progeny: — Grief from moral degradation the least supportable — why? Effects of sudden shocks of grief on sensitive minds. Disappointments of the affections: — Grief from loss of fortune, &c. Influence of repeated disappointment and losses — of harassing difficulties. — *g.* Hope and fear — their effects on health. Confidence. Various anticipations — their effects. Anxiety; — that of professions, particularly of medicine. Anticipated happiness — effects of the sudden arrest of, on sensitive minds, &c. Terror, fright, &c. — often productive of nervous diseases, and sometimes of mental disorder. — *h.* Gratitude. — *i.* Wonder. Desire of novelty. Mental languor. — *k.* Sublimity and ludicrousness. — *l* Love of approbation. — *m.* Desire of power and its related affections. Desire of Knowledge. Fame. Avarice.

Order 2. *Rational Emotions of Mind, arising out of moral and religious Obligations,* often strong incentives to action.

a. Rectitude, virtue, merit, and demerit, with all the duties we owe ourselves, as moral and responsible agents, and as tending to promote our intellectual and moral excellence and happiness. — *b.* Our various duties, as members of society. — *c.* Our religious obligations, as immortal beings. Remorse, or the consciousness of having neglected one or more of the above duties and obligations — sometimes productive of disorders of mind and body.

i. The influence of mental culture — intellectual and and moral — when duly directed in early life, upon the temperament and constitution, — upon mental and bodily health, — in developing and in strengthening both the mind and body.

ii. Temperament and constitution remarkably modify the operation of the affections of mind upon health. Illustrations.

iii. The influence of mental and bodily occupations — 1st, upon mind; 2nd, upon the body.

iv. Ill effects of want of occupation—Ennui—Hysteria—Hypochondriasis — Melancholy — Insanity — Suicide. Effects of solitary confinement.

v. Bad consequences of improper occupations and amusements, especially in females in early life. — Mental dissipation — its effects, particularly in impairing — 1st, Mental vigour; 2d, Bodily health.

vi. Consequences of habitual amusements, sensual indulgences, and pleasurable excitements, on the nervous system. These generate feelings calling for their repeated gratification, and for increased excitement, until nervous energy and vital power are exhausted, and until moral and physical ruin ensues.

vii. Good effects of a well-regulated and cheerful mind on health — of agreeable pursuits, particularly those exercising both the mind and the body. — The influence of confidence — of moderation — of contentment — and of agreeable and useful occupations, in securing both the health and happiness of their possessors.

chiefly from the unrestrained indulgence of the passions and appetites. To it, however, I shall more fully advert in the sequel. In respect of moral insanity, in its more extended signification, it is justly remarked by Dr. PRICHARD, that there are many persons living at large, who are affected, more or less, with this modification of mental disorder, and yet are reputed to be merely of a singular or wayward character. An attentive observer will often recognise something remarkable in their manners and habits leading to doubts of their entire sanity; and circumstances often appear which strengthen the suspicion. An hereditary tendency to madness may have existed in the family, or various members of it have been subject to diseases of the brain. The individual himself may have been the subject of an acute attack of insanity, or of inflammation of the brain, in a former period of his life; and from that time, or after having sustained some reverse of fortune, or the loss of a beloved relative, his temper and dispositions have undergone a change. This alteration of character may likewise have followed some dangerous illness or severe shock of constitution, especially fever, phrenitis, paralysis, apoplexy, or epilepsy. In some, the alteration in the temper, in the passions, the habits, or the disposition, may have been gradual or imperceptible; in others, sudden, or almost immediate upon its determining cause. In either case, it seems to have consisted chiefly of an exaltation of peculiarities or dispositions, more or less natural or habitual to the individual. In this state, a person may continue for years, following the bent of his perverse inclinations; always engaging in new pursuits, and soon relinquishing them, without any sufficient object or inducement excepting caprice. At length the total perversion of his affections, and dislike, or even enmity, to his dearest friends, excites alarm.

71. *a.* When the head of a family is affected with this ambiguous modification of insanity, it often becomes necessary, to prevent ruin from absurd extravagance or wild projects and speculations, to make some attempt at taking the management of his affairs out of his own hands; but for this the laws are inadequate, and the endeavour is often unsuccessful. Persons labouring under this disorder are capable of reasoning upon any subject within the sphere of their knowledge, and often display great ingenuity in giving reasons for their conduct, or in justifying their moral feelings. In these cases, as well as in others belonging to other modifications of this species of insanity, the feelings and passions are more or less excited, whilst the controlling faculties of reason and judgment — of attention and comparison — are equally weakened, errors in action and conduct resulting therefrom.

72. Moral insanity is not, however, limited to a preternatural excitement of the passions and temper, but comprises many other disordered states of the mind. Indeed, its varieties are almost as numerous as the modifications of disposition and temper. The most frequent forms are characterised, either by the kind of excitement just noticed, or by melancholy dejection. Either of these forms of moral disorder may continue more or less permanently; but they sometimes alternate or supersede each other, an opposite state of temper or feeling arising without any obvious cause. The prevalent character of the affection is occasionally derived from the natural disposition of the individual; but it is often remarkably different,— lively persons becoming dejected; and the melancholy or taciturn, lively, loquacious, or sanguine.

73. *b.* When *sorrow* or *gloom* is natural to an individual, and is not excessive, it does not amount to disorder; but, when it is remarkable and constant, without any real cause, it becomes a moral disease, although entirely devoid of any illusion or hallucination. Dr. PRICHARD remarks, that this tendency to morbid sorrow and melancholy, as it does not destroy the understanding, is often subject to control when it first arises, and probably receives a peculiar character from the previous mental state of the individual, from his education, and his religious or irreligious character. Persons of well regulated minds, when thus affected, express grief and distress at their conscious inaptitude to the active duties of life; and often feel a horror of being driven to commit suicide, or some dreadful crime to which they feel various obscure impulses or tendencies. This idea haunts them, and renders them fearful of being a moment alone. It, however, generally subsides, and a healthy state of mind returns. Persons of an opposite character frequently relapse into a state of *tædium vitæ*, or of morose disgust; loathe their very existence, and at length attempt to end it. A state of gloom and melancholy may, however, give way to a state of morbid excitement.

74. *c.* When the moral disorder is one of *unnatural excitement*, the person affected is full of projects and enterprises, or is active and boisterous, beyond the limit that belongs to a naturally lively disposition. This state of disorder may occur in persons whose temperament is the reverse of either the sanguine or lively; and it then becomes the more striking. It usually displays itself in a want of self-government, in continual excitement, an unusual expression of strong feelings, in thoughtless and extravagant conduct. A modest female becomes violent and abrupt in her manners, loquacious, impetuous, talks loudly and abusively of her friends or relations before entire strangers; or uses indecent expressions, and betrays, without reserve, unbecoming feelings and trains of thought. Persons thus affected often become drunkards; and a debauch is followed by raving madness, requiring restraint or confinement, which, with abstinence, removes, for a time, the maniacal excitement; but as soon as restraint is withdrawn, they resort to their former excesses, although well aware of the consequences. This form of the disease I have met with in two instances in professional men.

75. *d.* In examples of a different description, as Dr. PRICHARD remarks, the mental excitement constituting the disorder is connected with *religious feelings*, especially when the period of excitement has been preceded by one of melancholy, during which the person affected has laboured under depression and gloom, mixed with apprehensions as to his religious or future state. Formerly possessed by a dominant sense of condemnation and abandonment, when all hope and comfort have vanished, and nothing has mitigated the gloom and sorrow of the present, or allayed the dark and fearful anticipations of the future, his feelings become suddenly changed, and he

experiences a lively joy in his contemplations, amounting often to rapture and extasy. Such a change is hailed by the devout as a happy transition from religious destitution to divine acceptance and grace. But the train of excitement is too high, the expressions of happiness too extatic, to be long mistaken; pride and haughtiness, a violent or boisterous deportment, and selfishness, are soon betrayed, with want of natural affection, variability of spirits, and irregularity of mental habits and of conduct. In these cases, there is no false sensation or perception impressed upon the understanding; no illusion or belief of a particular sentence of condemnation, or message of acceptance, specifically revealed. If this existed, the case would be one, in which the moral disorder is only the consequence of a false perception or delusion, and consequently one which belongs to another species of mental disease.

76. *e.* Particular cases are marked, as noticed by PINEL, ESQUIROL, HOLLAND, and PRICHARD, by the prevalence of *certain passions* and *mental habits*, displayed under modifications, of which the human mind, in a sane state, seems hardly to be susceptible. Amongst these is an unusual prevalence of angry and malicious feelings, arising without provocation or ordinary excitement, constituting what PINEL designates, "*Manie sans Délire.*" There are many instances, observes Dr. PRICHARD, in which the whole diseased manifestation has consisted in a liability to violent fits of anger without cause, and leading to danger, or actual commission of serious injury to surrounding persons. The characteristic feature of this malady is extreme irascibility, depending on a physical morbid cause. There are other instances in which malignity has a deeper dye. The individual is continually indulging enmity and plotting mischief, and even murder, against some object of his malice. When this is connected with the false belief of some personal injury actually sustained, the case does not fall under the head of moral insanity. It involves hallucination or erroneous conviction of the understanding; but when the morbid phenomena include merely the expressions of intense malevolence, without provocation, actual or supposed, the case is strictly one of moral insanity.

77. *f.* In some instances, the *impulses* and *propensities* to which the patient is subject, or which he has indulged, are so exalted or disordered, as to constitute the sole manifestations of insanity, as ably insisted upon by REIL, HOFFBAUER, and PRICHARD. A sudden impulse to commit an atrocious act may arise in the mind of a person otherwise apparently sane, and in possession of his intellectual faculties; and be resisted by reason and self-control, on each of many occasions of its successive occurrence. At last the patient either may doubt his own powers of control, solicit the interference of his friends, and submit himself to restraint; or he may, at last, be unable to resist the impulse. In other cases, crimes have been perpetrated without any fixed object or motive, and the punishment of the law has overtaken the victim of disease. Insane persons may display their states of mental disorder by a propensity to commit every species of mischief, although devoid of any feeling of malevolence. A propensity to theft is frequently a feature, and often the characteristic one, of moral insanity. In some, it may be nothing more than eccentricity of character, as Dr. PRICHARD supposes, but it is more commonly associated with other manifestations of mental disorder, when actually amounting to moral insanity, and is to be viewed in connection with the individual's position in society, with his previous habits and character, and with the existence or non-existence of mental derangement in any member of his family.

78. *g.* *Moral Insanity* — the *Manie raisonnante* of PINEL — the *Monomanie raisonnante* of ESQUIROL — is often manifested, especially, by the singular, absurd, and exceptionable nature of the actions, intentions, and propositions of those affected by it. Persons thus disordered are turbulent, unsociable, and engaged constantly in affairs which are blameable, ridiculous, and contrary to their former habits, to their real interests, and to the interests of their families. Their moral character is altogether perverted, and they become dangerous chiefly to themselves and to those depending upon them, owing rather to the consequences, than to the nature, of the actions which they commit. Although engaged, or entering upon, what compromise their interests and character; or abandoning the objects of their affection, or quitting their families or affairs; they argue strongly in support of their conduct. Whilst there is a change or total perversion of the habits and affections, there is also sufficient power of intellect to attempt a justification of the sentiments and actions they have espoused.

79. *h.* Moral insanity has been viewed by M. ESQUIROL as presenting either an *acute*, or a *chronic* course; and he believes that it may be divided into *three stages*:—In the *first*, the character and habits are changed; in the *second*, the affections are perverted; and in the *third*, maniacal excitement, or violence of the temper or passions, with degradation of the faculties, more or less rapidly ensue. It may assume a remittent or intermittent course; and, after recovery from it, relapses are very frequent. If uncontrolled, it often passes into, or becomes complicated with, one or other, or even with more than one, of the other forms of insanity about to be distinguished, and even also with palsy.

80. *i.* The variety of insanity, termed *Senile Insanity* by Dr. BURROWS, as occurring in old age, often assumes the form of moral insanity, but more frequently that of general imbecility. In the former case, it consists in a morbid excitement of the passions, and a remarkable perversion of the temper and propensities—in a change in the whole moral character, without any hallucination or false perception, the existence of which would constitute it a different species of mental disorder.

81. A variety of instances, as Dr. PRICHARD observes, is mentioned by writers, in which the unusual intensity of particular passions or emotions has been thought to constitute mental disease, and compound epithets have been applied to these states of the mind and its affections. *Nostalgia*, and *erotomania*, have been considered as disorders of sentiment; *satyriasis*, and *nymphomania*, of the physical feelings. The excessive intensity of any passion is disorder in a moral sense. It may depend physically upon certain states of the constitution; but this does not so clearly constitute madness as the irregular and perverted manifestation of desires and aversions. This form of in-

sanity has undoubtedly been the source of moral phenomena of an anomalous and unusual kind, and of certain perversions of natural inclination, which excite the greatest disgust and abhorrence. Besides these, however, there are others, to which I may also more particularly advert, and which are noticed by M. ESQUIROL as constituting forms of monomania, under the designation of *Monomanie d'Ivresse*, of *M. incendiaire*, and of *M. homicide.* There may be doubts of the propriety of considering these, or even *erotomania*, as forms of insanity. But it is difficult, in respect of the mental manifestations, as well as of the bodily functions, to draw the line of demarcation between health and disorder; and there can be no doubt that the excessive excitement of any particular passion, sentiment, or emotion, or the undue predominance of it for an unusually long period, or the uncontrollable impulse or desire to appease or to gratify any appetite, amounts to moral disorder, which becomes the more manifest and indisputable, as it is the more freely indulged. As long as reason restrains the appetites, passions, and emotions, within the conventional limits prescribed in society, and is competent to the decided exercise of this sway, moral disorder cannot be said to exist; but when it loses this salutary influence, and in proportion as it is incompetent to exert such influence, either from the violence of passion, or the weakness of the understanding, the mental disorder is the more evident.

82. *a. Erotomania — Monomanie érotique* of ESQUIROL — is *characterised by an excessive love of some object, real or imaginary.* — It is a mental affection in which amorous ideas are as fixed and dominant, as religious ideas are in religious monomania or melancholia. Erotomania is very different from satyriasis and nymphomania. In the latter, the mischief is in the reproductive organs; in the former, it is in the mind. The one is a physical, the other a moral, disorder. Erotomania is the result of an excited imagination, unrestrained by the powers of the understanding; satyriasis and nymphomania proceed from the local irritation of the sexual organs, reacting upon the brain, and exciting the passions beyond the restraints of reason. In the former, there is neither indecency nor the want of chastity; in the latter, there is unrestrained expressions of sexual desire and excitement. The one is commonly caused by ungratified, or disappointed, affection excited in a virtuous mind; the other, by inordinate irritation or indulgence of the sexual passion.

83. In erotomania, the eyes are bright, the manner and expressions tender and passionate, and the actions free, without passing the limits of decency. Self and selfish interests are all forgotten, in the devotion paid, often in secret, to the objects of the mind's adoration. A state of extasy often occurs in the contemplation of the perfections which the imagination attaches to the subject of its admiration. The bodily functions languish during this state of moral disorder; the countenance becomes pale and depressed; the features shrunk; the body emaciated; the temper inquiet and irritable; and the mind agitated and despairing. The ideas continually revert to the loved and desired object; and opposition, or endeavours to turn them in a different direction, only render them more concentrated and determined in their devotion. At last, parents and fortune are abandoned, social ties broken asunder, and the most painful difficulties are encountered, in order to obtain the object of admiration.

84. In some cases, the attempts made by the patient to conceal and to overcome this affection, occasion a state of irritative fever, with sadness, depression, loss of appetite, emaciation, &c., which has not inappropriately been termed by LORRY *Erotic Fever;* and which, after continuing an indeterminate period, may even terminate fatally. When a young person becomes sad, absent in mind, pale and emaciated, sighs frequently, sheds tears without any obvious reason, is incapable of mental or bodily exertion, scarcely speaks to any one, loses appetite, &c., it is sufficiently evident that the mind is inordinately possessed by some desired object. If a strong effort be not made to dispossess it of the predominant sentiment, or if the object of desire be not obtained, the symptoms become still more distressing. The corporeal functions languish, the eyes sink, the pulse becomes weak and irregular, and the nights disturbed and sleepless. At last a form of slow hectic is produced; and the weaker organs, especially the lungs and heart, are the seat of slowly produced disease; the whole frame is blighted, and the patient sinks from the injurious influence of the mental affection on the vital organs.

85. This form of moral disorder may increase, and affect the intellects in a much more serious manner, until general insanity or mania is developed; and, with the progress of time, it may at last terminate in dementia or incoherent insanity. In each of these, the primary character of the disorder, or the original moral affection, will still continue to be manifested by the frequent suggestion of the same train of ideas, or recurrence to the object of devotion.

86. *β. The irresistible propensity to intoxication* — *Monomanie d'Ivresse* of M. ESQUIROL — may be viewed as actually constituting a variety of moral insanity, and indeed has been thus considered by the able and experienced writer just named. There can be no doubt of early advances of partial as well as of general insanity being sometimes indicated by an irresistible impulse to indulge in intoxicating liquors. And this impulse may be connected with a physical or corporeal feeling, rendering it still more irresistible, especially to persons of weak character. In many cases, indeed, the insanity is not so much caused by the intoxication, to which it is so frequently imputed, as the impulse to indulge it is a symptom of the incipient mental disorder. This is especially the case when a person, previously temperate, suddenly addicts himself to the use of intoxicating liquors, and particularly of ardent spirits. Sometimes, at the commencement of insanity, the state of the stomach, and even of the whole vital organs, is such as to be attended by an irresistible craving for stimulating fluids — by a kind of *pica.* This craving and the mental impulse accompanying it are generally suddenly developed; and occasionally, after having been appeased and gratified, they do not again return until after some time. Moreover, at this period of the mental disorder, the moral powers are weakened, and the mind altogether enfeebled and incapable of sufficiently resisting the morbid impulse, which is usually also attended by ennui, irritability, painful sense of sinking at the epigastrium, and restlessness. The desire to appease this

instinctive craving is, at last, imperative. When gratified, the patient becomes violent, maniacal, and dangerous to himself and to those around him. He continues to swallow the intoxicating fluids as long as he can procure them, or as long as he has the power of doing so, until the paroxysm terminates. As the patient becomes sober, the maniacal turbulence often subsides, but it frequently continues for some time afterwards, often for many days, with signs of more or less vascular excitement of the brain and its membranes; and, in many cases, when he can revert to the means of intoxication as he becomes partially sober, the insane violence is very considerably prolonged. At last the paroxysm terminates, and the craving for exciting liquors is no longer felt. Instances have even occurred of these liquors being afterwards loathed, until another paroxysm took place. M. Esquirol met with a case of mania consequent upon intoxication, which was followed by a distaste of all fermented and distilled liquors for ten years afterwards. Some persons, unable to withstand the impulse to intoxication occasioning fits of insanity, have solicited the restraint of friends; and others have committed suicide when they found themselves unable to resist the morbid impulse.

87. This state of moral disorder, whilst it gives rise to fits of maniacal excitement, aften also occasions more permanent mania, and even dementia. The maniacal paroxysms, when thus excited in females, are frequently associated with hysterical symptoms; and when mania or dementia is consequent upon it, palsy is not an infrequent complication.

88. *γ. Incendiarism is sometimes an act of partial insanity — Monomanie incendiaire* of Esquirol — *Pyromanie* of Marc. (*Ann. d'Hygiène*, t. x. Paris, 1833.) — It is, however, more generally one only of the modes in which an evil or mischievous propensity manifests itself, when excited by envy, jealousy, or revenge, in the minds of persons unrestrained by reason and by the laws. Yet instances are recorded by Henke, Esquirol, Marc, and others, of persons being impelled to the commission of this act by an irresistible impulse, which their will was incapable of overcoming. Most of these cases have occurred in girls and young women, who were either pregnant, or disordered in the uterine functions. Several of them presented signs of increased determination of blood to the brain; and some manifested other signs of insanity, either with, or without, illusions or false perceptions. M. Esquirol concludes, from the history of cases of this kind, observed in France and Germany—1st, That mental alienation, whatever may be the character of the delirium, determines some insane persons to commit incendiarism; and, 2dly, That there is a variety of monomania without delirium (without hallucination) characterised by an instinctive impression — an uncontrollable impulse — to commit this crime.

89. *δ. Homicidal Insanity — Monomanie homicide*, Esquirol — *Fureur maniaque*, Fodéré — *Manie sans Délire*, Pinel. — Murder, or attempts to murder, are made by insane persons — 1st, When impelled by an involuntary impulse, or instinctive desire, which they are unable to resist; 2dly, When actuated by motives on which they are capable of reasoning, and whilst conscious of the evil they have committed; 3dly, When influenced by illusions, hallucinations, or false perceptions; 4thly, When excited by passion or opposition; 5thly, When they believe that they are opposing an enemy, against whom they should defend themselves; and, 6thly, When the intelligence is so prostrate as to be incapable of distinguishing right and wrong, and when they act from imitation. It is respecting the *first* and *second* of these — the former especially — that I now proceed to offer a few remarks.

90. Persons who appear to enjoy reason, but whose active moral powers — whose affective functions of mind, in the language of French pathologists — are disordered, must, conformably with what I have advanced, be viewed as insane. These persons perceive, compare, reason, and judge correctly of matters, but they are influenced by the least cause, or even without any object, to acts of violence. They are irresistibly, or instinctively, impelled, with a full consciousness of their state, to commit the crime they most hate. They deplore their situation, and give warning to guard against their fury, or to deprive them of the power of committing the dreaded act.

91. But the question has been long since and often proposed — Is there really a form of insanity in which a person may enjoy reason unimpaired, and yet commit the greatest of crimes? M. Esquirol formerly answered this in the negative; and stated, that of the partially insane, who appear to enjoy their reason, and to deplore the determinations by which they are so strongly impelled, all admit that they have felt something internally or mentally at this time, of which they could give no clear account; that their brains were embarrassed; that they experienced more or less difficulty — often an inexpressible difficulty — in the exercise of their judgment; and that this was preceded by physical symptoms which they perfectly recollected. One felt a burning heat or a pulsation in the head; another, a lacerating or a sharp or acute sensation rising from the abdomen to the interior of the cranium; a third, a momentary illusion or hallucination; or a fourth was betrayed by an erroneous process of reasoning. One person suddenly becomes red in the face, imagines he hears a voice addressing him, and acts according to the injunction he believes imposed on him, or to the call addressed to him. A husband is persuaded that his wife is unfaithful to him; and, although every circumstance is considered by him, and found to militate against the truth of the persuasion, yet, in a moment when the jealous feeling gains the ascendancy, an act of murder is committed. The mother of a family believes that her situation is distressing, and that her children will be reduced to mendicity. In a fit of despair she forms the resolution of destroying them, in order to preserve them from a calamity which she considers greater than death; but in the moment of her attempting it, maternal tenderness, speaking louder than despair, exclaims, "Protect my children from me!"

92. All these instances may be referred to a momentary delusion or hallucination, under the influence of which crimes or insane actions may be committed, after which a lucid period occurs. But there are other instances which cannot be thus explained, and which do not altogether warrant the conclusion at which M. Esquirol arrived in his earlier work; and of this he is aware in his more recent production, for he there admits that,

although partially insane persons are often betrayed by their delirium or their hallucinations into the commission of homicide, yet there are others who commit the crime from an instinctive or irresistible impulse. In the former class of insane homicides, the understanding is disordered, under the influence of false perception, or of a delusion momentarily entertained, and the insane person acts under an error of judgment; but, in the latter class, reasoning and judgment are altogether suspended, and the insane impulse impels and directs the will, without any effort of the understanding or of the moral powers to prevent the act. An individual thus affected acts uninfluenced by delirium, or delusion, or emotion, or passion, and almost without consciousness, impelled by an instantaneous, blind impulse, independent of the will, and before which reason and judgment are for a moment entirely prostrate. This constitutes the paroxysm of monomania without delirium of the French writers. Of this affection I have met with three instances. In two of these, however, there was more or less disorder of the digestive organs; and in the third, a female, the catamenia were disordered; but there was no other indication besides this of mental alienation. This subject is most important, and is, moreover, very intimately related to *suicide*, inasmuch as the morbid impulse to destroy one's self is similarly manifested, as will be shown in the sequel, and much more frequently than the impulse to destroy another. Yet has it been nearly overlooked by most writers, and especially by those of this country, notwithstanding the growing increase of both crimes, and the evidence furnished, by a careful inquiry into their remote causes, of a progressive increase of them being likely to result. Homicidal monomania most frequently occurs in persons of a sombre, melancholic, or capricious disposition; but it is also met with in those who are remarkable for the amiability of their tempers and manners. The state of the atmosphere, disorder of the digestive and excreting organs, excitement of the nervous system, a vicious education, the reading improper books, and accounts of crimes, suicides, &c., unsound and exalted religious sentiments, the influence of imitation, chagrin and disappointment, want, &c., are chiefly concerned in developing this moral distemper. A very few instances from among many will illustrate this state.

93. The mother of four children was suddenly seized with the desire of killing them, and flew from her house as the only way of preventing the commission of the act. A maid, on each occasion of her dressing the infant committed to her care, was seized with an uncontrollable desire to murder it. A man experienced repeated impulses to murder his wife, to whom he was warmly attached, and was prevented on one occasion from attempting it by an accidental occurrence. He applied to the author for advice, and to be placed under restraint. He was at that time apparently well, and capable of pursuing his usual avocations. A person, after reading the horrible details of a murder, which was circumstantially narrated by the daily and weekly caterers to the most depraved passions of the multitude, was suddenly seized with an impulse to kill his wife. It has been observed in France, in Germany, and in England, that the publicity given to the particulars connected with a murder has been followed, within a few days, by several attempts to commit this crime.

94. Although various moral causes combine, in some cases, to predispose the mind to be influenced by the insane impulse to perpetrate this and other crimes, yet it will be found, in most, if not in all, instances, that the person thus *morally* affected is also *physically* disordered, if the examination be made with sufficient care, and with the requisite knowledge of the several manifestations of gradual and insidious disease of the brain and of the abdominal organs. A most attentive examination of the various functions of the brain and of the senses connected with it — of the temperature and circulation of the head — of the functions of those viscera which most readily sympathise with the brain, and which so powerfully influence both its actions and its circulation, and even of the appearances of the tongue, and of the several excretions — will generally disclose more or less disorder in one or more of these quarters, and prove, that although there may not be very obvious disease, there is lurking mischief, either primarily or consecutively, but always most seriously, affecting the brain. In the slighter and more incipient states of morbid action in this organ, the general and local sensibility and the circulation often betray little or no disturbance, and indeed the whole amount of physical disorder may be so small as to escape the detection of all, excepting the closest observer, who, from experience, will look for it, and detect it, more readily in the sympathies, and in the symptomatic affections, of remote parts, than in disorders of more closely related organs. It is reasonable to infer, that when capillary action in the brain is slightly but very generally disordered, and especially when this disorder commences gradually, and almost imperceptibly, and proceeds slowly and insidiously, those manifestations of mind which are of the highest order in the scale of mental development will be the earliest and most seriously deranged; and that, as the physical disorder proceeds or extends, the other orders of mental operation — the *intellectual* and the instinctive (see *Classification* at § 66.) — will become successively implicated, until the various phases of moral and intellectual insanity are passed through, and instinctive insanity, or fatuity, is ultimately reached.

95. *B.* PARTIAL DISORDER OF THE UNDERSTANDING — *Amenomania* of RUSH — *Monomania* of ESQUIROL — *is characterised by false perceptions, illusions, or erroneous convictions, referring to one or a few subjects merely, or involving chiefly a single train of ideas, and so impressing the mind as to partially disorder the judgment.* Partial insanity of the understanding may exist — 1st, *In a more or less simple form*; or, 2dly, *Associated, or complicated, with moral insanity.* Indeed, most of the instances in which crimes are committed in the insane state present this latter form. Even the more simple states of monomania of the understanding may be said to be insanity with reference to a small number of subjects, rather than to one subject only; since the number of persons who are insane upon a single subject merely is comparatively few. Most of the cases usually denominated monomaniacal are those which present some predominant idea, or hallu-

cination, amidst other indications of mental weakness or disorder, as I have already contended (§ 68.).

96. This species of insanity was distinguished by the term *melancholia*, from the age of Hippocrates, till M. Esquirol imposed upon it the name of *monomania*. As the former expression suggested the idea that partial derangement of the understanding is essentially connected with sadness and despondency, and as this is not the case, the latter term is much less exceptionable, although not always strictly applicable, for the reason just assigned. The expression, therefore, which I have made use of at the commencement of this section is more applicable to the different states of this species of derangement, than any single word that can be employed. Although the illusions which possess the minds of persons partially insane are as varied as the operations of the intellect, yet they very frequently are productive of either happiness or distress to the patient. Hence they admit of being divided into those which are pleasurable or exciting, and those which are gloomy or depressing, — a division, indeed, which has been adopted by Rush and Esquirol. Still there are some predominant ideas, which do not necessarily produce either happiness or misery, but which may be contingently associated with either, or with each alternately. Indeed, many persons become insane upon some metaphysical or abstract subject, on which they talk absurdly, but without any disposition to grief or to elevation of mind. It should also be remarked, that M. Esquirol has comprised under monomania those states of moral disorder already noticed, and which have been excluded by Dr. Prichard, under the belief that they are unconnected with any illusion or hallucination. But, as I have already contended, the judgment is more or less impaired in these states of moral disorder, although not to such an extent, or in such a way, as to give rise to a precise morbid perception, or perversion of the understanding; and self-control is remarkably weakened.

97. The forms of partial insanity of the understanding have been distributed into many orders or kinds. The subdivisions would be endless, if it extended to as many different kinds as there are modes or varieties of hallucination; at most a division can be founded upon the prevailing passions or emotions, which give origin, and impart their peculiar character, to the disorder; but even this would be too extended. It might, therefore, be sufficient to arrange them into — 1st, Those characterised by exaltation or excitement; and, 2dly, Those evincing more or less depression. This arrangement, however, would exclude more than one of the varieties of mental disorder which fall under the present head, or of those hallucinations which are not necessarily connected with either exaltation or despondency, and which yet may be attended by either. It will be preferable, therefore, after having taken a general view of this species of insanity, to notice more particularly the chief forms which it most frequently assumes.

98. *a.* General View of Partial Insanity. — The remark already made (§ 68.) as to moral insanity, is also applicable, and even more so, to partial disorder of the understanding; and this is, that the mind is not perfectly sound on subjects unconnected with the particular impression by which it is possessed and more prominently disordered. There are certainly cases in which the understanding seems quite rational on all topics, excepting those connected with its illusion or hallucination; but, even in these, it will be found, on closer observation, more or less weakened or impaired, owing to deficient powers of attention and comparison. The individual affected is certainly, in ordinary circumstances, calm, and devoid of those signs of perturbation and constant excitement characterising mania, or raving madness. But it will be found, that his habits and disposition have been long more or less changed; that he has presented a greater or less degree of moral insanity; that his powers of application and attention have been weakened for some time; and that an erroneous belief or illusion has gradually arisen in the course of these disorders. Very frequently a settled or habitual despondency, or melancholy, or moroseness of temper, or even a sullen misanthropy, has existed, has slowly increased, and has disordered and perverted his feelings and affections. Ultimately some delusion supervenes, which may at first be fugitive, but which afterwards becomes more fixed and constant.

99. *a.* Dr. Holland very justly remarks, respecting the commencement of the slighter forms of partial disorder of the understanding, that many persons have felt, at one time or other (oftenest, perhaps, during the "severa silentia noctis"), some dominant idea or feeling to possess the fancy, retaining its hold with a sort of malignant power, despite all efforts to shake it off; and, by degrees, distorting the subject, especially if it be a painful one, into a thousand false and alarming forms. If this train of thought be interrupted, and time, society, and other objects, come in between, the mind is conscious of passing, as out of a bad dream which for a while had overshadowed it. But let there be a cause for the continuance of this state, and we have an approach to monomania in some of its various shapes; nothing apparently wanting but the intensity, which is often so singularly testified in these cases by the actions induced, and by the long duration of the delusion. Pinel mentions instances where the same single insane impression continued without change for twenty or thirty years.

100. The illusion which torments the monomaniac is generally something bearing a near relation to his former habits of business, or to the usual occupation of his thoughts. In fact, the long persistence of the mind in one idea or feeling, not duly broken in upon, or blended with others, is, as Dr. Holland well remarks, a state always leading towards aberration. Indeed, the common, and often the only, evidence of insanity, especially in its earlier stages, is that drawn from the dominance of a single impression, faulty, perhaps, only in the absence of those which should modify and correct it. It may be alleged, that this reasoning tends to remove all distinction betwixt the sound and unsound mind, and to reflect madness back, as it were, upon the healthy and natural state of the faculties of man. But this is not truly so. The extremes are widely apart, and are readily recognised. It is only in the slighter states of divergence, where mental health is lapsing into disorder, that marks of practical

distinction may be difficult, or misunderstood. The existence of more doubtful cases, graduating between reason and insanity, is but a part of that law of continuity, which pervades both the moral and the physical world; and which, although furnishing difficulty to the legal consideration of insanity, yet should present but little to the adoption of appropriate moral and medical treatment.

101. It is often difficult to account for the occurrence of the hallucination disordering the understanding. But, as just observed, the illusion entertained is generally connected with the former habits, business, and opinions of the patient. Dr. PRICHARD remarks, that an individual of a melancholic temperament, long influenced by circumstances impairing his health and calling into play the morbid tendencies of his constitution, sustains some unexpected misfortune, or experiences great anxiety, becomes despondent, and broods over his feelings, till the prospects of life appear to him dark and distressing. His inclinations now are so altered, that no motive can rouse him to exertion; his gloom and despondency increase; his imagination fixes upon some particular circumstance of a distressing nature, and this becomes afterwards the focus round which the feelings which harass him concentrate themselves. This circumstance is often some real, occasionally some trifling, act of delinquency, for which the patient expresses the strongest, and perhaps disproportionate, self-condemnation. In other instances, an unusual phantom suggests itself, in harmony with the prevalent tone of the feelings; and this at first haunts the mind as possible, and is at length admitted as reality. Some individuals begin by indulging morose or malignant feelings to their acquaintance; and, by magnifying in imagination every trifling neglect into a grievous contumely, they fancy at length that they find, in some casual occurrence, glaring proofs of premeditated designs to ruin them and expose them to the contempt of society. The disease in these cases has its real commencement long before the period when the particular delusion, which is only an accessory symptom, is discovered, and even before it became impressed on the imagination.

102. *β*. An undue indulgence in a single train of thought of any kind, particularly when involving any moral emotion, may lead to partial insanity, especially when the individual is physically disordered, or is out of health — when his digestive, assimilating, and excreting functions are deranged, and his nervous energies are weakened; and this is the more likely to occur, if his intellectual and moral powers have been imperfectly or improperly cultivated in early life. In these cases, the insanity is gradually developed, or in a similar manner to that now described: in some it is the consequence of excessive devotion to a particular department of abstruse investigation — of exertion beyond the natural energy of the mind in one particular direction, and to the exclusion of countervailing healthful occupations of the intellectual and moral faculties, and of requisite relaxation of mind; in others, it gradually arises out of the habitual indulgence of some moral emotion or sentiment, or of some more violent passion, intellectual energy becoming impaired, and at length more obviously disordered. In many instances of this kind, as well as of the preceding, the insane delusion is occasioned chiefly by fears, anxieties, expectations, and excitements, of either a religious, a political, or a domestic nature, or even by the terrors produced in weak and susceptible minds by the vehement language and denunciations of popular and other preachers. The following case adduced by Dr. PRICHARD illustrates the connection of the hallucination with previous occupations, and with the moral influences to which his mind was subjected. A young man, whose father was frequently employed in criminal prosecutions, had assiduously attended the sermons of a preacher noted for the vehemence of his exhortations, and had devoted himself, to the neglect of sleep and bodily exercise, to studies, for which he was unprepared. He became depressed in spirits, and disordered both in mind and in body. The morbid feelings which afflicted him at length conjured up an imaginary cause for themselves, that soon became indelibly impressed on his belief. He fancied himself suspected of some horrible crime, for which a process had commenced against him; and, whenever the door of his room was opened, he supposed that officers of justice were coming to apprehend him.

103. It is unnecessary to adduce instances in proof of the position already stated, that the erroneous belief or delusion, constituting partial disorder of the understanding, is generally, or at least frequently, consequent upon, and afterwards associated with, previously existing moral insanity. Whether this connection exists so universally as Dr. PRICHARD believes, I will not assert; but it doubtless may be traced in the great majority of cases. It will further appear from what I have next to adduce, that the illusion is generally some notion as to the powers, property, or destination of the person affected, engrafted upon his habitual state of desire or aversion, passion or sentiment — or an erroneous idea or belief arising out of morbid sensations, which the imagination, influenced by predominant feelings, emotions, passions, or trains of thought, converts into diversified shapes; and that the illusion consequently assumes a character and form, more or less obviously moulded by such feelings and trains of thought.

104. *b.* HYPOCHONDRIACAL MONOMANIA. — *When the fears, apprehensions, and despondency of an individual are concentrated on his bodily feelings, relate to some disorder by which he is affected, and which he exaggerates, and are connected with an erroneous belief, or hallucination,* a state of disorder exists, which may be aptly termed *hypochondriacal monomania, or hypochondriacal disorder of the understanding.* The mental affection here gradually supervenes in the course of the bodily disorder. — The *first stage* of the malady is *hypochondriasis*, and does not, as I have contended (see the article, § 19.), amount to insanity, until the hallucination is manifested. It is true, that it is on the verge of insanity, — that it is closely allied to it, — and that it may be viewed, in its more fully developed states, as a variety of moral insanity; but still, until an erroneous belief is entertained, the mere exaggeration of bodily ailments, and the apprehensions, despondency, and concentration of the attention towards them, do not constitute, especially in the eye of the law, a true form of mental derangement. In the great majority of

instances, the hypochondriacal affection does not pass into, or occasion, an insane delusion; but when this change has taken place, and when a man fancies that his head is too large to enter in at the door, that his legs are made of clay, or that he has a fish or a demon in his stomach, the nature of the disease is different, and in no respect doubtful.

105. A flatulent hypochondriac may ultimately suppose that a living creature or a demon, according as he may be influenced by religious or superstitious ideas, is actually lodged in his abdomen. Dr. Jacobi (*Samml. f. d. Werk. der Gemüthekrankheiten.* Elberj. 1822, p. 21.) mentions the case of a man, quiet and rational on other topics, who entertained the notion that there was a person concealed in his belly, with whom he held conversations. He often perceived the absurdity of this idea, and grieved in acknowledging and reflecting that he was under the influence of it, but yet could never get rid of it. An attempt was made to cure this man by applying a large blister on his abdomen, and, when it was dressed, and the vesicated skin snipped, by throwing from behind him a dressed-up figure, as if just extracted from his body. The patient at first believed in the success of the performance, and was joyful in the full persuasion that he was cured; but some morbid sensation about the bowels, which he had associated with the insane impression, being again experienced, he took up the idea that another person similar to the first was still left within him.

106. *c.* Melancholic Monomania — *Melancholia* of authors — *Lypémanie* of Esquirol — *Tristimania* of Rush — *Melancholia with delirium* of Pinel — *is characterised by sadness and despondency, the mind being given up to fears and anticipations of evil, to an erroneous belief or impression, concerning one subject, or a particular series of subjects.* — Authors since Hippocrates have applied the term melancholia to delusions characterised by sadness and despondency; and this form of insanity was, according to Galen, so denominated, because all the sad or desponding moral affections depended upon a depravation of bile, which had become black, and obscured and disordered the animal spirits. Cælius Aurelianus and most of the ancient writers did not distinguish between melancholia and hypochondriasis; and even the authors of the 15th, 16th, and 17th centuries continued to confound them, although various relations between melancholia and other affections of the mind were distinctly pointed out by them. M. de Héréda and Forestus first noticed the connection of gloomy ideas and despondency with a partial delirium, or delusion, in this malady; and Sennert considered that the insane delusion was consequent upon despondency. Hoffmann and Boerhaave marked the relation between melancholia and mania, and the frequent origin of the latter in the former, — thus regarding melancholia as a slighter grade or earlier stage of mania. Sauvages defined melancholia to be a partial or exclusive delirium, without furor or excitement, associated with a chronic disease. Cullen was among the first who took a correct view of this malady, and who carefully distinguished it from hypochondriasis; but it is chiefly to Pinel, Esquirol, and Guislain, that we are indebted for accurate ideas as to its nature and relations.

107. *a.* Most writers have been more particular in their descriptions of the fully developed state of melancholia, than in pointing out the origin and rise of the malady, the importance of which is by no means small; and have overlooked the commencement of it in the moral disorder already noticed. M. Guislain and Dr. Prichard have, however, remarked the absence of delusion in the more simple and early forms of the complaint. M. Guislain observes, that there are melancholics without delirium or hallucination, as well as maniacs without any remarkable disorder of the intelligence, and these exhibit the most simple form of the distemper. Such persons are sad, depressed, despondent, &c.; but evince no remarkable aberration of the imagination, of the judgment, or of the intelligence. In this stage or state of disorder there exists only a form of moral derangement, which may proceed no further. But when erroneous notions or delusions, or a disposition to entertain an idea of suicide, or attempts to commit it, are manifested; or when any unusual or irrational determination is shown; then the disorder is no longer simple, but is fully developed and established, and actively influences the will.

108. In this state the patient is quite cognisant of what takes place around him; he appreciates more or less his situation, and recognises his friends and enemies; but fear, despair, or despondency, govern him — he is absorbed by the painful sentiment. Overwhelmed by it, prostrated, lying on his bed, or sitting with clasped hands, his head bent forwards, his eyes obliquely fixed on their object, he presents the very image of sadness. His voice is low; his expressions and acts are slow, prudent, and distrustful; he answers only in monosyllables; seeks solitude, and is reserved. His countenance is pale or sallow; his features are altered; his brow more furrowed; and he appears older than he is. He often complains of a sense of weight in his head, and sometimes of a void or of a feeling of emptiness in his cranium, occasionally with uneasy sensations or pains in the scalp. His repose is unsound — his senses only being asleep, while his mind is awake; and he complains of not enjoying an hour of sound repose; but occasionally he is somnolent. He is kept awake by his fears, jealousy, or illusions; and when he dozes, he is terrified by phantoms and frightful dreams. One, after having passed a good night, is more depressed and unquiet. Another believes that he will not get over the day, and yet feels better as the night approaches; and a third has his inquietude increased at night, dreading the solitude, the obscurity, the sleeplessness, the frightful dreams and phantoms attending every attempt to get rest.

109. Some refuse for several days all kinds of nourishment, restrained by illusions or hallucinations which increase their chimerical fears. Some dread poison, dishonour, &c.; and others abstain from food, in order to escape from a wretched existence, or to do penance for a supposed crime. The sensibility of some is acute, and the slightest occurrences produce the most vivid impressions. Heat, cold, rain, wind, light, noise, and all physical agents affect them inordinately. If there be the slightest cause of fear, they are terrified; if there be the least cause of regret, they are in despair; if they suffer the smallest reverse or disappointment, they be-

lieve themselves ruined. Their nervous system is morbidly susceptible, and their moral emotions, especially those of a gloomy kind, are remarkably exaggerated. They are physically and morally susceptible; and yet their sensibility is concentrated upon one object, or train of ideas. So complete is the concentration of their feelings, that they are almost inaccessible to impressions unconnected with the subject of their melancholy; a moral abyss separates them from all objects and sentiments that present no relation to their fears or delusions.

110. Anxieties and fears respecting any matter, and all the depressing passions, particularly when long indulged, or frequently reiterated, sway the intellect and judgment, and originate thoughts the most opposed to the dictates of common sense. These may ultimately pass into false perceptions and hallucinations, which will further increase the unjust inferences, the morbid belief, the unfounded fears, and the terrors already entertained. Fear, in all its forms, whether proceeding from a real or an imagined cause, exercises a dominant influence on the melancholic. A person whose fears have been excited by denunciations against religion, becomes, under the influence of these fears, anxious and depressed; his sentiments and power of attention are concentrated upon the object of his insanity; his fears exaggerate their causes, as well as the consequences which these causes may produce; and at length delusions are generated and entertained, influencing not only his thoughts, but also his actions. The victim of fanaticism or superstition may thus ultimately believe himself to be pursued by the vengeance of Heaven; or he may become the prey of anxieties, as to his state, so intolerable as to lead him to prefer death to incertitude. He who has offended the laws, continually apprehends the officers of justice; and, at last, believes himself in their power. Another, who has long dreaded the wickedness of man, ultimately believes that some one threatens his fortune, his honour, or his life; the least noise, sign, or doubtful word, exciting and confirming his fears or his belief. Some are afraid of every thing, and are subject to perpetual anxiety, or are terrified by a vague sentiment, without motive or object. Their expressions, attitudes, actions, and discourse, express extreme fear, which they cannot overcome, and which they cannot explain, or account for.

111. The delusion of the melancholic derives its character from the moral affection which preoccupied the mind on the appearance of the malady. A merchant has experienced losses of little moment, and he believes himself ruined, notwithstanding demonstration to the contrary; two brothers have had a dispute, and one becomes persuaded that the other has an intention to murder him, to obtain his property. Frequently, some one of the moral sentiments of the melancholic is so remarkably exaggerated, as to predominate over every other consideration, and to give rise to acts of despair. Many of the murders committed during this malady are the result of this morbid state of feeling. A mother abandoned by her husband attempts to destroy her children, to prevent a similar misfortune; and a religious enthusiast kills his infants, to send them to heaven before their minds are corrupted.

112. Some melancholic persons are conscious of the absurdity and the falsity of the fears by which they are tormented. They reason respecting them, and even are distressed at being the victims of their apprehensions; but still they continue a prey to them, and they find it impossible to think or act otherwise than under this dominion. An insurmountable power governs their reason, and they believe that the Almighty, or some demon, or fate, or some other power, influences them. The will of the hypochondriac is inflexible. No consideration or sentiment can overcome his alarms and errors, or his aversions.

113. *β*. The *physical symptoms* of melancholia vary much in different persons, and even in the same person in different periods of the disease. The patient sometimes has a sense of constriction in the chest, and places his hand over the heart, complaining of anxiety and oppression, or of pain in that organ. The pulse is more frequently slow, than natural or accelerated. The tongue is often loaded, the appetite is impaired, the bowels costive, and the whole series of digestive functions more or less deranged. The urine is often pale and abundant.

114. *γ*. The *Diagnosis* of melancholia from hypochondriasis becomes a matter of some importance, seeing that they have been confounded by the older writers, and that the one may be mistaken for the other. Melancholia is more commonly hereditary than hypochondriasis, depending upon the melancholic temperament, which predisposes to the operation of the exciting causes, especially errors in education, and other influences acting directly on the brain, the sensibility, and the understanding. The causes which produce it are more generally moral; whilst hypochondriasis more commonly proceeds from causes which are physical, and which modify the functions of the stomach and other digestive organs. In melancholia there is a fixed delusion or insane idea, which is entertained with sadness and despondency, and a vicious association of ideas. In hypochondriasis, on the contrary, there is no insane delusion, until the disease passes into melancholia; but the patient exaggerates his sufferings — his mind is continually occupied with his ailments, which he believes to threaten his life — and he is continually subject to dyspepsia and other disorders of the digestive functions. — See article HYPOCHONDRIASIS (§ 19.).

115. *δ*. The *Causes* of this species of insanity are — the melancholic temperament, hereditary conformation or constitution, moral susceptibility, and increased sensibility; sudden shocks, reverses, disappointments, anxiety of mind, and all the depressing sentiments; frights, terror, fear; losses of fortune or of friends and connections; political reverses, and changes, and revolutions; fanaticism, superstition, and unsound views of religion; wounded self-love, humiliating circumstances or occurrences; masturbation, and whatever causes physical and moral exhaustion; and injuries of the head.— The *pathological* causes are chiefly — the suppression of accustomed discharges, protracted indigestion; and hypochondriasis, diseases of the heart, and of the digestive organs, obstructions of the liver and mesenteric glands, diseases of the uterus, &c. Most of these, however, are rather coincident disorders, than influential agents in the production of the mental affection.

116. M. ESQUIROL states, that of 482 cases of melancholia, the chief causes were—hereditary pre-

disposition, in 110; domestic unhappiness, in 60; reverses of fortune and distress, in 48; disappointed affection, in 42; the critical period of life, in 40; the puerperal state, in 35; venereal excesses, in 30; suppressed menstruation, in 25; intemperance in wine, in 19; frights, in 19; anger, in 18; wounded self-love, in 12; injuries of the head, in 10; jealousy, in 8; and masturbation, in 6. It is obvious, however, that this is only an approximation to accuracy, as, in many cases, several causes have concurred in producing the disease.

117. ε. The *course* of melancholia is usually continued, but is sometimes remittent, or even intermittent, or recurrent. It has even been observed to have been periodic. — Its *duration* is most variable. When it terminates in health, the change generally takes place between the third and the thirteenth months, — six months being about the average duration of these cases. Although there is so little moral reaction in this species of insanity, yet it is amongst those from which recovery most frequently takes place. A favourable change has been observed to follow the occurrence of a natural evacuation, especially when that has been suppressed, as the menstrual and hæmorrhoidal discharges, &c. It has also disappeared after the breaking out of boils and cutaneous diseases. The occurrence of hæmoptysis, of tubercular consumption, and of asthma, has sometimes been observed to dissipate an attack of melancholia; but the patient has died of the consecutive malady.

118. On the other hand, various organic lesions often appear in the course of melancholia, and are to be viewed rather as being favoured by it, than as accidental occurrences. Certain of them, indeed, have been considered as concerned in the production of the mental disorder; but it is much more probable, that the physical and moral changes are the results of the state of organic nervous influence, although the physical may augment the moral, and *vice versâ*, — the one acting and reacting on the other.

119. ζ. The *visceral diseases* most commonly observed in the course of melancholia, or in fatal cases of it, are tubercular and other organic lesions of the lungs, chronic pleuritis, enlargements and engorgements of the liver, alterations of the heart and spleen, and various displacements of the colon, particularly the descent of the transverse arch. This last change was first insisted on by M. ESQUIROL; and has been observed in melancholia by BERGMAN, WICHMANN, HESSELBACH, GUISLAIN, MÜLLER, ANNESLEY, and myself. The transverse arch is sometimes displaced obliquely, so that its left flexure is carried downwards behind the pubis, and it occasionally descends perpendicularly, in a loop or duplicature, as far as the pelvic cavity. Displacements of this viscus are observed also in other forms of insanity, but not so frequently as in melancholia. M. ESQUIROL considers that organic lesions of the brain are not frequent in this species of the disease; the number of cases in which changes were observed by him in this part being much smaller than observed by M. FOVILLE and others, who have more justly appreciated the minute alterations which take place in it during mental disorders. M. ESQUIROL confirms the remark of LORRY and MEAD, that tubercular phthisis is the most frequent cause of death in melancholia, and subjoins the following enumeration of the organic lesions found in 168 cases: — *Within the cranium* — thickening of the membranes, 2; organic alterations of the substance of the brain, 4; ossific deposits in the falx, 3; effusions of blood in the brain, 5. *In the chest* — organic lesions of the lungs, 65; disease of the heart, 11; effusion into the thoracic cavities, 6. *In the abdomen* — displacement of the colon, 33; adhesions and suppurations of the peritoneum, 5; ulceration in the stomach or pylorus, 6; ulceration in the intestines and rectum, 7; intestinal worms, 5; tænia, 1; organic lesion of the liver, 2; biliary concretions, 7; ulceration in the uterus, 6.

120. η. Melancholic monomania may *pass into*, or become *associated with*, some one of the other varieties of insanity, or even with more than one of them. It occasionally passes into mania, and even degenerates into dementia. In this state the patient retains the predominant ideas; but these are incoherent, without order, and do not harmonise with the actions; whilst previously the ideas were strong and fixed, and the determinations of the will were the immediate results of the characteristic delusion and trains of thought.

121. *b.* DEMONOMANIA. — The Chaldeans, the Phœnicians, the Jews, and the Greeks believed that most diseases, particularly those of the brain and mind, proceeded from demons or evil spirits. JOB was said to have been the victim of a demon; and SAUL to have been under the influence of an evil spirit. ARISTOPHANES termed the highest grade of madness, not *μανία*, but *κακοδαιμονία*. HERODOTUS was, however, nearer the truth, when he said that CLEOMENES had become mad from intoxication among the Scythians, and not by the presence of a demon. M. ESQUIROL has, conformably with the original acceptation of the word, comprised the two varieties of partial insanity about to be noticed, under the appellation of *Demonomania*. The first of these varieties, or *Theomania*, is still of frequent occurrence; the second, or *Cacodemonia*, was common in ancient times and during the prevalence of popish superstition; and, indeed, still frequently occurs in countries where superstition lingers.

122. *α.* The *Theomaniac* is characterised by an enthusiastic belief in divine selection and acceptance, and in the future eternal damnation of all who do not think, as to religious matters, exactly as he does; by a belief of having received revelations from the Almighty, or of being inspired, or of holding communications with the Holy Spirit, or with angels or saints; or by a belief of having received a mission from Heaven to convert sinful men. Persons who have had their minds inordinately excited by preachers who are themselves thus affected, or who are noted for the vehemence of their language, and by the enthusiasm of their belief in the more alarming or exciting topics of religion; or those whose thoughts have been long or painfully directed, especially during nervous exhaustion and susceptibility, to these topics, and to the punishments of a future state, and have become impressed by exaggerated ideas of their own wickedness; not infrequently become melancholic, and after a time theomaniac. But, whilst this latter state of mental disorder may thus appear consecutively in some, it may occur primarily, from the same moral causes, in others. In the former cases, it is a state of morbid mental reac-

tion consequent upon the previous depression, and belief of condemnation; in the latter, it is a state of primary mental excitement, connected with more or less delusion. The instances of religious excitement furnished by the "revivals," the camp meetings, and field preachings in America and Scotland, the modern "gift of tongues" in this metropolis, are all forms of this kind of partial insanity; which, however, is sometimes of temporary continuance only, especially in hysterical and excitable females; but which often passes into more furious mania, or confirmed insanity. The frequency of this form of mental disorder in females, and other circumstances belonging to its history in this sex, show its occasional connection with hysteria; and that at least the hysterical state favours its occurrence.

123. β. *Cacodemonia.*—NEWTON remarks, that when men abandoned the worship of the true GOD, the stars became the first objects of their idolatry, as most striking to the senses; and were supposed to exercise a continued and active influence on the mind. Melancholy was then thought to depend upon the course of the planets; and the frequent periodicity of the disorder confirmed the belief. Hence the word *μηνη*, luna, furnished the appellations mania, lunaticus, lunacy, for this and other mental disorders. The doctrine of spirits taught by SOCRATES, PLATO, and even by still more ancient philosophers, having become associated with Christianity, the influence of these spirits upon the human body became an article of general belief, and was implicitly received, until the Reformation, and the mental freedom to which it led, dispelled the mists of superstition. The dread of yielding to the instigations of the devil, and of being in the power of demons, led to the institution of exorcisms, and to ceremonies in the more primitive church, to deliver those who were believed to be thus possessed. These ceremonies tended to cherish the idea as to the influence of evil spirits; and was, indeed, with various concomitant circumstances, the chief cause of the continued belief in this source of mental disorder. With the extension of popish superstition, the numbers of demonomaniacs increased; and, in many of the larger cities of Europe, stated feasts and ceremonies were established for their cure. The pomp and solemnity observed on these occasions, and the crowds assembled, struck the imaginations of those affected, and contributed to the cure of a few of them. In these times, demonomania assumed a variety of forms,—and the most common and the most recent were those of sorcery and witchcraft. As long as both church and state prosecuted and cruelly punished those objects of self-delusion and of popular belief, the community were firmly persuaded of the reality of demonomaniacal possession; but as soon as governments ceased to punish these extravagancies, the chimerical fears which affected the populace, and by which the minds of the weak, of the melancholic, or of the hysterical were tortured, gradually subsided, and ceased to produce their wonted effects, and cases of this form of derangement were rarely observed. The progress, also, of education and of knowledge dissipated these errors, which led to, and nurtured, a belief in the influence of demons; yet still, in popish countries, some monomaniacs believe themselves in the power of demons, and furnish instances which may serve to illustrate, or to explain, the psychological extravagancies which disgraced governments and religion for so many centuries. The delusions arising out of ignorance, improper education, and superstition, gave rise, in those days, not only to the most humiliating errors of the understanding, but also to the most cruel exhibitions and actions of which human nature was capable. The history of mental delusions arising out of the superstitions, the wild doctrines, and the fanatical extravagancies which disgraced Europe for so many ages, furnishes innumerable proofs, not merely of the narrow limits of the human understanding in those times, but also of the degraded state of the passions and moral sentiments. How frequent and how horrible were the instances which then daily occurred, not only of the delusions of ignorance and superstition, but likewise of the lowest depravation of moral feeling! A reign of superstitious terror continued to exert its baneful influence on the human mind, blighting the intellectual powers, and withering the most generous and ennobling of the moral emotions.

124. In the present day, although the instances of monomania arising from a belief in the power of demons, or evil spirits, are rare, those which proceed from other causes of terror — especially from the fears of future damnation, as inculcated by fanatics and enthusiasts, and from the dread of imprisonment or of civil punishment—are as numerous as ever, — each case presenting characters derived from the principal cause of disorder. In modern times, M. ESQUIROL remarks,—and especially during the civil commotions in France, in the end of the last, and commencement of the present, centuries, — monomaniacs express as much dread of the tribunals of justice, as they formerly entertained of the influence of demons and of evil spirits. It is always fear, dread, and anxiety, which affect these unfortunate creatures, and cause the disorder which possesses them.

125. *c.* MISANTHROPIC MONOMANIA is sometimes met with, particularly in persons of a melancholic temperament, who have become hypochondriacal, or who have experienced disappointments in their affections and friendships, or who have been unfortunate in their attachments and well-founded hopes. In these persons, and even in others where the origin of the affection is less manifest, dejection of spirits is associated with malevolent feelings; and the resulting effects are, a distrust of every one, and a belief in machinations and persecutions intended for their ruin. They are in a state of continued misery; they believe themselves objects of universal hatred and detestation. They not only conceive plots of all kinds being formed against them, but also consider their dearest friends to be their most implacable enemies. They suspect poison in their food or drink; and their imaginations convert every act or every expression into designs to injure or to insult them.

126. *f. Excess of self-love* is an ingredient in every modification of monomania; but when exaggerated ideas connected with personal advantages or mental accomplishments are entertained, — when self-love, in the more common forms of vanity or of pride, is inordinately indulged,— either the mind becomes disordered from the repeated or continued contemplation, or the mental disorder is coloured by this circumstance when produced by other causes. Dr. PRICHARD observes, that ex-

cessive self-love, combined with an elated and sanguine disposition, instead of depressed spirits and a morose temper, produces cheerful illusions, which always maintain their relation to the person of the lunatic. A monomaniac fancies himself a king, the pope, a favourite of Heaven. This, however, does not constitute a single delusion, leaving the mind perfectly sane upon other points; for the same individual generally magnifies himself in other respects. Nor does the gay and cheerful state of monomania always result from this association of excessive self-love with the sanguine disposition, as supposed by Dr. Prichard; but rather from a vitious education, and from the excessive indulgence of the emotions of vanity and pride, especially in early life, in connection with various concurrent causes acting upon the nervous system of susceptible, weak, and nervous persons.

127. *g.* The preceding comprises all necessary to be stated in order to recognise the more simple states of partial disorder of the understanding. But, as these states are often consequent upon moral disorder, and occasionally are associated with it from the commencement, the physician should be prepared to meet with, in practice, numerous instances of *the association or complication of these forms of derangement.* To describe the almost innumerable modes in which each of the several forms of moral insanity may be complicated or associated with either of the varieties of partial disorder of the understanding, would be endless; and even to adduce instances illustrative of some of the more striking states of this complication, would be far beyond my limits, and be attended by few advantages. The works of Guislain, Heinroth, Prichard, and Esquirol furnish sufficient examples of this association; and to these I refer the reader. Besides, no one can possibly mistake cases of this description, when they come before him in practice, nor misapply the means, moral or medical, which they require for their treatment.

128. ii. General Insanity.—In general insanity, not only are the *moral emotions* and the *intellectual faculties* weakened or deranged, but all the *instinctive desires* and *feelings* (see note, § 66.) are also disordered. The ideas are in a state of confusion, and perpetual and general disturbance, and none of the powers or manifestations of mind can be exercised even for the shortest period. General insanity presents three principal species, usually denominated *Mania*, or raving madness; *Dementia*, or incoherent insanity and mental imbecility; and *Fatuity*, or annihilation of the mental faculties. To each of these I proceed to direct attention.

129. *A.* Mania, or *Madness — Hyperphrénie*, of Guislain — *Raving Madness — is characterised by a disordered association of ideas, which are reproduced without connection and with extreme rapidity, by remarkable derangement of the understanding or judgment, by alienation of the affections, by the violence of the will or volition, and frequently by false sensations, illusions, or hallucinations.*—It is either a chronic disease, or liable to lapse from an acute into the chronic state; is commonly unattended by general fever, although the pulse is usually more or less accelerated, especially at an early stage; and it chiefly consists of *perturbation* and *exaltation of the sensibility*; of *disturbance of the instinctive, the intellectual,* and *the moral manifestations of mind;* and of *excitement of volition.*

130. *a.* The *acute form of mania* presents itself in different grades of intensity; the *mildest* of which has been denominated by Guislain, *Tranquil Mania*, and may be named *sub-acute mania;* the most violent, as described by Chiaruggi and others, may be called *hyper-acute mania.* Either state, however, may pass into the other; and both may commence more or less suddenly, and reach their acme with great rapidity. Generally, however, *premonitory symptoms,* manifestly indicating very serious vascular disorder in the brain, have existed for some time before the mind becomes evidently deranged. In the case of an eminent writer on medicine, who died some years since, marked indications of vascular excitement in the brain were evident to me more than a twelvemonth before mania burst forth. Almost always for some days, often for some weeks, and even for months, before the disease is established, occasional fits of excitement and perturbation, disturbing for a time the judgment, are experienced. The patient is, during this time, or at various periods, in a state of agitation, of feverishness, and of uneasiness. He is restless; morbidly active; his imagination is lively; he is full of projects, often trifling or absurd; and he enters upon pursuits with energy, but relinquishes them quickly and without sufficient reason. His head is generally hot, his feet cold; his sleep is short, broken, and disturbed; and he either lies awake, ruminating on various speculations; or gets up, paces the room, or attempts to occupy himself, but each successive attempt is soon relinquished, in a state of perturbation, or of quiet distraction. During this period, some experience fits of painful terror, or of agitation, and not only pass sleepless nights, but by day are in a constant state of uneasiness and restlessness, or of action leading to the performance of little or nothing. Others are disquiet and depressed, and are impressed by a feeling of an impending calamity, or by a dread of losing their reason. In some, the appetite is voracious; but the stomach is readily disordered, and intemperance is followed by severe affection of this organ. In others, the appetite is deficient or capricious. The bowels are often torpid. At this period, a desire of intoxicating liquors, and intemperance in the use of them, are manifested suddenly, although previously disliked.

131. At length reason is overturned. The individual scarcely knows what he says; repeats his words often, or talks nonsense, or is unable to complete his sentences, or suddenly breaks off in the middle of them. He utters confused expressions, in a rapid or impetuous manner; or he makes ineffectual efforts to collect and to express his thoughts. He appears to those about him in a state resembling intoxication. He laughs, cries, is irritable, is prone to anger on the least opposition, and is most obstinate, self-willed, and capricious. This morbid state of mind may continue for some time, — particularly when humoured by friends,— without exciting much alarm, or leading them to adopt measures of restraint. At length, on some attempt being made to interfere with, or to oppose, his absurd pursuits, he breaks out into the wildest violence, and even attempts acts destructive of, or injurious to, others or himself, and requiring the most strict coercion.

132. This state may exist without any false perception, or delusion. Very frequently, however, as soon as violence is manifested, some illusion or hallucination, or absurd impression as to his own person or powers, or his relation to others, appears; but it is seldom permanent, as in monomania; it is soon forgotten, or gives way to some other phantom.

133. *α.* In the *milder*, or *sub-acute cases*, the disease may proceed without much violence, unless the patient be greatly excited; but his emotions are capricious, warm, and enthusiastic, and his ideas are confused, inconsistent, or unconnected. He seems half drunk, and like one who endeavours to collect his thoughts and to express them connectedly, but fails in the attempt. His temper is irritable; he is self-willed; his habits, feelings, and affections are changed; he is incapable of any exertion, of attention, or of thought; is in a constant state of uneasiness and of restless action, without being capable of performing any thing; and is altered in countenance, expression, and general appearance.

134. *β.* In *severer*, or *more acute cases*, or as the disease increases in violence, all the phenomena are more developed. The malady may proceed for many days, or even weeks, before it reaches its highest pitch. During this period, the derangement varies somewhat according to the predominance of particular feelings or passions. Sometimes the patient is terrified and agitated; frequently he breaks out into the most violent expressions of rage and enmity against his relations or friends, or whoever may have been obliged to exert control over him, or restrain his mad proceedings, uttering bitter execrations, or threatening vengeance and condign punishment. His nearest and dearest relatives are now the objects of his most vehement displeasure. As the malady approaches its acme, his ideas become more and more disordered and unconnected. His thoughts and feelings are expressed with exclamations and ejaculations, with the utmost agitation of countenance and manner, and with the most violent and irregular gesticulation and action. He is so absorbed by his internal sensations and emotions, as to be almost unconscious of external objects and impressions. He seems deprived of all affection, of all ideas of right and wrong, of every feeling of shame, of every principle of probity and honour, and of all parental or filial affection. The advice, conversation, or even the presence, of near relatives, irritates or exasperates him. He utters the most blasphemous, the most filthy and indecent, language; and the most injurious, calumnious, scandalous, and unjust expressions, respecting his dearest friends. Many maniacs are disregardful of cleanliness and personal decency, and are most disgusting in their expressions and habits. They seem as if excited by an internal heat, enabling them to bear, often with complete impunity, the continued impression of great cold; and they sometimes even complain of it either in the head, or in the abdomen, or circulating in their veins. Hence their desire to go almost without clothes, or to expose their persons. They are occasionally deprived of sleep for many days, or even weeks, together. They generally become more or less emaciated, and the features haggard, wild, or maniacal. Their eyes are watery, suffused, red, prominent, brilliant, and fixed or vacant. Their motions are quick and threatening; and the expression of their countenances so changed, as often not to be recognised by their friends. All the functions are now disordered. The bowels are obstinately costive, especially early in the disease; but afterwards they are often irregular. The appetite is frequently lost for many days; but it is sometimes voracious. The tongue is furred or loaded; the skin cold and clammy, excepting on the head; and a frothy saliva, mixed with mucus, is often excreted.

135. *γ.* The *most acute states of mania* have been graphically described by Pinel and Chiarugi. At the commencement of such cases, the patient is impetuous, audacious, menacing in his aspect, and shameless in his habits; his forehead is contracted; his eyebrows are drawn up; his hair bristled, and his breathing hurried. His evacuations are deficient; and his skin becomes dirty and sallow. His countenance begins to glow; his eyes become fiery and sparkling; his looks unfixed; his eyelids drawn widely open and closely shut by turns; his eyeballs prominent or protruding and injected; he is insensible of cold and hunger; and his sleep is lost, or it is very short and unquiet. As the disease proceeds, his loss of reason, violence, and anger are remarkably increased; he shrieks, roars, rages, abuses his dearest friends; destroys or breaks whatever comes in his way; tears his clothes to pieces; and is often disposed to go quite naked, or with his person exposed. Whoever touches him, is abused or struck by him. His ideas are strangely confused, and his mind is occupied by absurd prejudices or delusions. After a period of violence, stillness takes place for a short time; and when alone, he talks, gesticulates, and exclaims, as if he were wrangling with persons about him. When restrained, or confined, his countenance assumes a satanical or ferocious expression: he throws away, with imprecations and shrieks, the food presented to him, but is compelled by thirst to swallow fluids. After some days, hunger begins to be felt; and often the most disgusting things are taken greedily. Even the excrements, in some instances, are devoured; and the evacuations, which are usually dark and offensive, are smeared over the clothes, beds, or walls. Notwithstanding the patient's constant exertion, and prolonged want of sleep, his muscular strength seems to increase; his limbs acquire remarkable pliability and nimbleness, and the greatest feats of strength and agility are performed without exhaustion. However bold and menacing he may be, a strong threatening voice, a piercing and commanding look, and even the sight of the means of secure restraint, readily daunt him. After his violence has expended itself, he becomes still, or gloomy, and appears as if brooding over something; but he breaks out, often unexpectedly, into a new storm of rage and violence. At length a real cessation of violent paroxysms ensues: exhaustion, with unquiet sleep, disturbed by fearful dreams, takes place. The pulse becomes small, the general aspect squalid and meagre, and the countenance pallid and haggard. The patient is now obstinately silent, or sings and laughs in a strange manner, or chatters with incessant volubility; and at times seems as if lapsing into a state of fatuity; but these uncertain intervals are frequently interrupted by short fits of violence. Memory, how-

ever, continues without much impairment during the course of the disease, and the senses possess an unusual degree of acuteness and susceptibility.

136. Acute attacks of mania generally attain their highest intensity, or begin to decline, in about a month from their commencement. In many, however, intervals, or remissions merely, of the violent symptoms occur, about or soon after this time; and from such remissions may be dated the accession of the advanced or chronic stage of mania. When patients do not recover after a succession of attacks, either the powers of mind are exhausted to so low a grade, that the disease lapses into permanent fatuity, or the mental exhaustion continues as a period of calmness, after which an attack of violent madness recurs; or it passes into a state of melancholy, or of mental incoherency. As the maniacal attack becomes chronic and confirmed, so frequently does it assume either of these forms; but, in the more prolonged cases, sense and understanding are more and more completely abolished. During the more acute states of the disease, patients are rarely affected by any epidemic or contagious malady; and, according to several authors, dropsies, consumption, and various other chronic diseases have disappeared on the accession of violent madness. In many cases, however, the disappearance of these has been illusive, the maniacal affection merely *masking* the pectoral or other disease, which may have been in some degree interrupted in its course, but rarely removed, or even materially benefited.

137. *b. Chronic* or *protracted mania* is generally consequent upon either of the forms of *acute mania;* but it may follow any of the varieties of *partial insanity,* already described; or it may appear as the *primary affection.* This last, however, is the least frequent mode of its accession. It is, in many instances, merely a stage of transition between acute mania and dementia or incoherency, but a very protracted one in most cases, and of very uncertain duration. It often lasts for many years, and sometimes for the greatest part of life, and is the state of alienation presented by the great majority of the inmates of asylums. *Chronic mania* is characterised by marked impairment of the powers of attention, memory, comparison, combination, and, consequently, of judgment; and is a state of intellectual weakness, in which none of the operations of mind is performed with effect, often associated with some false perception or delusion. The individual is quite incapable of continued conversation, and of the duties of society: his conduct and actions are without consistency, steadiness, or rational object; and his thoughts are wandering and incoherent, He presents a state intermediate between either monomania or mania, and dementia or incoherency — a mental condition, combining many of the phenomena of these disorders. It is to this class of cases — to this form of mania — that the term lunacy is, perhaps, most applicable. Dr. Prichard remarks that many continue long to display the characters of mania; but, except during particular periods of renewed violence or agitation, to which most are subject, they become more tranquil than at the commencement of this complaint. They show signs of incipient dementia combined with morbid activity of body, in which the excitement characteristic of their disease exhausts itself in almost perpetual action. Lunatics of a different class fall into a state of calm reverie; their imagination, abandoned to itself, without the control of judgment, gives itself up to wanderings without end. Even in attempting to converse, or when their attention is excited by questions, they exhibit a strange mixture of reason and mistakes, both as to facts and inferences. Others — and these are the most numerous — are governed by some particular passion, mental habit, or delusion; the illusion having reference to their own persons, or to their relations to other individuals.

138. The illusions in this form of disorder are not, like those in monomania, cherished in the mind, and brooded over in silence, in solitude, or in gloomy reserve: they are more connected with the present objects of sense, and are for ever changing with the casual alterations of feeling or temper. In a great number of those who are threatened with general paralysis, or who are already attacked by it, M. Calmeil has shown a peculiar form of delusion to exist. The patient is in a state of exaltation or of joyous delirium, fancying himself the owner of millions, of towns, empires, &c. He is intoxicated by the flattering belief, and joy manifests itself in his features and gestures. Illusions of this kind often precede the accession of paralysis for several months, and continue for some time afterwards; but they are gradually obliterated with the last traces of intelligence, as dementia becomes developed. In other instances, the joyous delusion assumes a form of maniacal delirium, with excessive agitation and anger; and continues with short intervals of quietude until death ensues, or until it terminates in dementia. In a great many protracted cases, the principal phenomena are referrible to some particular habit or active propensity, and are unconnected with any hallucination or false perception. Indeed, every variety of human pursuit occasionally becomes the subject, in relation to which especially chronic madness is exhibited; and the disorder is displayed, in many instances, rather in the mode of action and conduct, and in the general weakness, or abolition of certain powers of the mind, than in any hallucination or illusion.

139. *c.* The *course* of mania is *continued, remittent,* and *intermittent.* The *remissions* may be more or less distinct and regular. They often take place every second day. Whilst there are many maniacs who scarcely ever sleep, there are some who sleep tolerably well. The former are often more quiet during the day than in the night. Others, again, are quieter and more impressible in the morning and in the evening. *Intermittent* mania is sometimes regular, and sometimes irregular, in its accessions. According to Esquirol, it constitutes about one third of the number of maniacal cases. It may assume either the quotidian, the tertian, or the quartan type. Or the attacks may recur every eight days, or every month or three months, or six months, or even after longer intervals. They are frequently induced by moral or physical causes, of a manifest kind, as contrarieties, and disorders of the stomach or bowels. Females often experience an accession of mania about each menstrual period, or after each lying-in, or when they suckle, or after weaning. In some it returns every spring, or every summer. Intermissions are more frequent in mania, than in any other form of insanity.

140. *d.* Mania is sometimes *complicated* with

cutaneous diseases, very commonly with hysterical symptoms in females, and often with hypochondriasis in men. It is frequently associated with epilepsy, and still oftener with paralysis, and with other forms of insanity; this last circumstance is the chief cause of doubt and difficulty in the classification of mental disorders.

141. *e.* The *Duration* of the malady varies from two or three days to many months or years. In its more prolonged forms it generally consists in a number of accessions and remissions. It may alternate with phthisis, hypochondriasis, and melancholia; but the pulmonary disease is only suspended during the maniacal attack. It may *terminate*, also, in either of these; but most frequently in dementia, paralysis, or fatuity, or in either dementia or fatuity conjoined with palsy.

142. *f.* The *Diagnosis* is apparent from the description I have given of mania. The more or less general disorder of the mental powers, and the turbulence, violence, and agitation attending it, sufficiently distinguish it from melancholia, and other forms of partial insanity. In the latter, a few only of the affections, the passions, and the desires, or of the sensations, perceptions, or ideas, are deranged. In mania, all the powers concerned in forming the understanding, and in distinguishing between right and wrong, are overturned; and the ideas, feelings, passions, and impulses arising in the mind violently influence the will, they being no longer controlled by the powers of the understanding, nor guided by notions of propriety. The violence, perturbation, and rapid transition of passion, of impulse, and of action, are consequences of disordered excitement, expressed more or less generally upon the moral emotions, and of deprivation of the instinctive feelings and of the intellectual powers, as well those of consciousness as of intellection and reflection. The moral emotions or affections of mind being morbidly excited and uncontrolled by the restraining and guiding influence of feeling and intellect — of affection and judgment — the disordered impulses of the will, and the disposition to commit absurd acts, become strong and violent, especially when opposed, unless the opposition be manifestly above removal.

143. *g.* The *Prognosis* is more favourable in this form of insanity, than in any other, although the most violent and alarming in its symptoms. — *α.* A *favourable result* is often attended by some critical evacuation or change, and especially by discharges from the stomach or bowels; by bilious evacuations; by epistaxis, hæmorrhoids, menorrhagia, leucorrhœa; by ptyalism; by cutaneous eruptions, particularly boils, carbuncles, and erysipelas. As long as mania is simple, it is cured more frequently than any other mental disorder; and especially if there be no very apparent or strong predisposition to it. A first attack generally admits of cure, if it be not complicated with palsy or epilepsy. A second seizure is also often removed, if it remain uncomplicated. But recovery becomes very much more doubtful after the third attack. M. Esquirol states, that of 269 cases of mania that recovered, 132 were from first attacks, 77 from second, 32 from third, 18 from fourth, and 10 from a greater number of seizures. The duration of the disease, in cases of recovery, is much shorter than in other forms of insanity, recovery generally taking place within the first year. Of the above 269 cases, 27 recovered in the first month, 32 in the second, 18 in the third, 30 in the fourth, 24 in the fifth, 20 in the sixth, 20 in the seventh, 19 in the eighth, 12 in the ninth, 13 in the tenth, 23 in the eleventh and twelfth, 18 in the second year, and 13 after the second year. The greater number of recoveries took place in autumn and summer.

144. *β.* An *unfavourable issue* is to be anticipated, if mania has continued longer than two years, and if it be complicated with palsy, epilepsy, or any organic disease. It is certainly fatal in any of these complications, chiefly from the nature of the malady associated with it. Instances are very rare of simple mania terminating fatally. The most frequent maladies causing death in mania are typhoid, or adynamic fever with cerebral affection, general paralysis, pulmonary consumption, epileptic convulsions, and exhaustion of nervous power. M. Esquirol asserts, that no appreciable organic lesion is found in the brains of those who have been subjects of recent uncomplicated mania. But in this, as will be shown hereafter, he is opposed by MM. Foville, Calmeil, Bayle, Guislain, Haslam, Prichard, and others.

145. *h.* The *Causes* which produce mania more especially may be briefly enumerated. — *α.* The acute states of the disease take place most frequently in spring and summer, and chronic cases are often exasperated in those seasons, and in high ranges of temperature. The disease more frequently commences some time between the fifteenth and forty-fifth year, than at any other epoch of life; and it is only in robust persons that it appears later than the fifty-fifth or sixtieth year. When it occurs at an advanced period of life, it is very apt to pass quickly into dementia, or to become complicated with paralysis. It also is more common in males than females, and assumes a more acute or violent form in the former than in the latter. Sanguine, nervous, and irritable temperaments, plethoric and robust constitutions, and susceptible and ardent dispositions, are most predisposed to this species of insanity. Employments and professions have a less marked influence in causing it: yet it appears to be somewhat more frequent in merchants, speculators, military men, and artists, than in persons otherwise occupied.

146. *β.* The individual occasional causes of mania are numerous, and very rarely act singly, but generally in various combinations, in producing their effects. In many cases, there is not merely a concurrence of causes, but also a certain sequence in their operation, necessary to produce the disease. A fright occasions suppression of the catamenia, and this is followed by mania, which subsides upon the return of the uterine discharge. — *Moral* causes are more influential than physical causes. Disappointed affection, frights, jealousy, and domestic misery, affect women chiefly; whilst mental exertion, reverses of fortune, and wounded self-love, principally affect men. — Of *physical* causes, hereditary conformation is by far the most common, and it is almost equally so in both sexes. The next in frequency are parturition, suppression of the catamenia, and abuse of spirituous liquors. The following enumeration is according to the influence they exert, as estimated by M. Esquirol. *Moral causes.* — Domestic unhappiness, disappointed love, fright, reverses of fortune, want, humiliated or injured self-love, excessive mental

exertion, jealousy, and passion. *Physical causes.* — Hereditary disposition, parturition, disordered menstruation, the abuse of intoxicating liquors, venereal excesses, masturbation, the critical periods of life, injuries of the head, insolation, fevers, the suppression and disappearance of cutaneous eruptions and of accustomed discharges, the abuse of mercury, apoplexy, epilepsy, &c., hypochondriasis, and melancholia, have been also enumerated as causes, but they are, when observed, the early or premonitory stage of the malady. (See *General View of the Causes of* Insanity.)

147. *B.* Dementia — *Incoherency — Imbecility — Amentia*, Sauvages — *Incoherent Insanity*, Prichard — *Démence*, Pinel — *is a chronic form of insanity, characterised by impairment of the sensibility and of the will, by incoherence of the ideas, and by the loss of the powers of consciousness and of the understanding.* — A person thus mentally deranged is no longer able to perceive and apprehend matters correctly, to seize their relations, to compare them, or even to attend to them. He cannot comprise, in his mind, an exact idea, or even a tolerable notion, of any one subject or object; but is occupied unceasingly with unconnected, incoherent thoughts, and with emotions arising spontaneously, without association or aim. Pinel defines this state of mental disorder to be an incoherency of ideas, which have no relation to external objects; a turbulent and incoercible mobility; a rapid and instantaneous succession of ideas which seem to be developed in the mind, without any impression having been made upon the senses; a continual and ridiculous flux and reflux of chimerical ideas and notions, which destroy each other almost as soon as produced, without intermission and without connection; a similar incoherent but calm concurrence of the moral emotions, of the sentiments of joy, sadness, or anger, which arise and disappear spontaneously, without leaving any trace, and without evincing any correspondence with external impressions.

148. *a.* An imbecile or demented person is deprived of the power of adequately perceiving objects or circumstances, of seeing their relations, of comparing them, of preserving a complete recollection of them; whence results the impossibility of reasoning or reflecting on them. He is incapable of forming any opinion or judgment, because external objects make too feeble an impression; because the organs of transmission have lost a part of their energy, or because the brain itself has no longer sufficient power to receive and to retain the impression transmitted to it: hence the feebleness, obscurity, and incompleteness of the sensations and perceptions. Being unable to form a just idea of occurrences or objects, the demented person cannot compare them, or exercise abstraction or association of ideas; his mind has not energy enough to exert attention, or any mental operation necessary to the integrity of its functions. Hence the most incongruous ideas succeed each other, without dependence and without connection or order: hence he talks without being conscious of what he says; and he utters words and sentences without attaching to them any precise meaning. It seems as if unreal expressions were heard by him in his head, and as if he repeated them in obedience to some involuntary impulse, the result of former habits, or fortuitous associations with objects which strike his senses.

149. A loss of the powers of perception, of attention, and of suggestion or association of ideas, and the consequent defect, or entire loss of memory — of the powers of consciousness and of intellection (see note, § 66.), — are manifestly the earliest and fundamental changes constituting dementia, whether in its *primary*, or in its *consecutive forms* (§ 150, 151.). Hence the want of sequence or connection between the ideas, the intellectual imbecility, and the assemblage of phenomena, which I have stated this disorder to present. It must be obvious that, originating in the failure of those fundamental powers, dementia will *vary in grade*, with the amount of such failure; and that the resulting effects, manifested by the higher faculties and by the moral emotions, will also vary, not only in degree, but also in kind, according to previous habits, disposition, &c. — giving rise, at first, to *imbecility* or to *incoherence*, the two slighter grades of *dementia*.

150. Incoherency, imbecility or complete dementia, appears either *primarily*, from the operation of the predisposing and exciting causes upon the mind or constitution; or *consecutively* upon other disorders of the mind or brain, which, by their long duration, or their severity, affect the alliance of the former with the latter, and the intimate condition of structure of the brain more especially. When dementia occurs *primarily*, it is usually caused by whatever overwhelms the powers of the mind, or completely exhausts them, as inordinate mental exertion, vehement emotions, protracted and inordinate anxiety; and, as I shall have to point out hereafter, it may thus appear primarily, not only as simple incoherency, but also complicated with general paralysis or epilepsy.

151. Where dementia takes place *secondarily*, it is generally directly consequent upon protracted mania, or upon partial insanity, or upon apoplexy, severe phrenitis, epilepsy, palsy, irregular gout, or fevers attended by cerebral determination and severe or protracted delirium. This consecutive state of dementia has been termed fatuity: it was confounded with idiotcy, until Esquirol very accurately distinguished between them; and showed that dementia is exhaustion or obliteration of an intellect which was once sound, by intense mental causes, or by maniacal or other diseases; whereas, idiotcy is a congenital state of fatuity, or an original want of the intellectual powers. The idiot, he remarks, has never possessed the faculties of the understanding sufficiently developed for the display of reason. The victim of dementia was once endowed with them, but has lost this possession. The former lives neither in the past nor in the future; the latter has some thoughts of times past, reminiscences which excite in him occasional gleams of hope. The idiot, in his habits and manners of existence, evinces the semblance of childhood; the demented person preserves, in his conduct and acts, the characteristics of consistent age, and bears the impress derived from the anterior state of existence. Idiots and Cretins have never possessed memory, judgment, sentiments; scarcely do they present, in some instances, indications of animal instincts; and their external conformation plainly indicates that their organisation is incapable of thought.

152. M. Esquirol has distinguished *three varieties* of dementia, — viz., the *acute*, the *chronic*,

and the *senile*, — either of which may be *simple*, or *complicated* with melancholia, mania, epilepsy, convulsions, scorbutus, and especially with general paralysis. — The *first variety*, or *acute dementia*, is caused by gross irregularities of regimen, diet, &c., by fever, hæmorrhages, by metastasis, suppression of accustomed discharges, and a lowering treatment of mania. It is sudden in its attack, is unattended by lesion of movement, and is curable by means of regimen, exercise, and restoratives, by the removal of the cause, &c. — The *second*, or *chronic dementia*, is either primary, or consecutive upon the diseases just mentioned, more frequently the latter. When it succeeds other forms of insanity, as mania or monomania, it preserves some traces of the character of the primary disorder, or of the dominant idea during the previous affection. When it is caused by drunkenness, it presents peculiar characters, the chief of which are general tremor, false perceptions, rapid pulse, general perspiration, &c.; and it closely resembles *delirium tremens*, — which, indeed, may be more correctly viewed as an acute form of dementia, than as a distinct malady. When dementia arises from this cause, it more frequently assumes an acute and a curable form, than a chronic and persistent state, — a circumstance which seems to have escaped M. ESQUIROL.—The *third variety*, or *senile incoherency*, comes on gradually with the progress of age, and shows itself in the loss of memory and of sensibility, in the weakness of the impressions and sensations, of attention and perception; in the vacillations, and uncertainty of the will; and in the slowness and incapability of motion.

153. Dr. PRICHARD considers that incoherency presents *four stages*, or *degrees*, consisting of different phenomena; the description of the one stage not being applicable to the other. If the disorder commences in the first degree, it goes on successively to the more advanced; but the more severe degrees may appear at once, as the immediate effects of causes which destroy the powers of mind, or produce disorganisation of the brain. —The *first stage*, or degree, he remarks, may be termed that of *forgetfulness*, or loss of memory. Its chief characteristic is a failure of memory, especially as to recent events.—The *second stage* brings with it a total abolition of the power of reasoning, depending on a loss of voluntary control over the thoughts. It may be termed the state of *irrationality*, or *loss of reason*.—In the *third degree*, the individual is incapable of comprehending the meaning of any thing that is said to him. It may be styled the stage of *incomprehension*.—The *fourth stage* is characterised by loss of instinctive voluntary action. The individual is destitute of even the animal instincts; he cannot obey the calls of nature. This is the stage of *inappetency*, or *loss of instinct or volition*.

154. The *first* of these, however, does not amount to dementia. It is often a premonitory state, or stage, which passes into complete incoherency or imbecility; but it as often continues simple, and stationary, without passing into more marked disorder. This is especially the case in old persons. They often lose their memory, particularly of recent events; and their sensibility, and the power of quick or rapid movement, become impaired. Recent impressions in them are weak; and hence they live upon past recollections, which they have pleasure in recalling. But their powers of reason and their judgment are not materially weakened; and, until these become very manifestly affected, they cannot be viewed as presenting even the slightest form of this species of insanity.—The *second* and *third grades* of dementia particularised by PRICHARD, are the common forms in which the disease occurs in either its primary or its secondary states. In these the powers of reason are lost; and the patient is as unable to control his ideas, as he is incapable of comprehending the meaning of any thing to which his attention may be called. The *fourth grade* is identical with the variety of general insanity about to be noticed, under the head of *Fatuity*, or annihilation of the powers of mind (§ 164.).

155. *α*. The *slighter forms* or *grades* of dementia, or *incoherency* and *imbecility*, are evinced by a loss of control over the ideas, and of the faculty of attention. The individual occasionally apprehends something of the meaning of a question; but, before he has uttered half his reply, he becomes confused or bewildered, and is turned aside from it by some accidental or new suggestion. His expressions are consequently irrelevant and absurd. In this state, his memory may not be altogether lost, though very much impaired, and glimmerings of reason are occasionally evinced. He affixes some meaning to his expressions, but he soon loses or forgets it. He may know his friends, but he displays no signs of sensibility or of emotion on being visited by them. In such cases, the *incoherency* is remarkable. In others, the impairment or loss of the powers of consciousness and of intellection (see note, § 66.), and a state of intellectual *imbecility* are more or less manifest. — Some patients, in these states, are capable of being employed in mechanical occupations, and particularly in what they had previously been habituated to; but even in these their imbecility is often conspicuous. Others, particularly when dementia is consequent upon mania, experience occasional paroxysms of excitement, in which the symptoms of more active mental disorder become prominent.

156. *β*. The *severer* or *confirmed states* of dementia are characterised by inability to comprehend the meaning of any question, however simple. Reason is entirely lost, and the person acts from instinct or habit. The physical activity is often remarkably displayed in this state of the disease. Some jump or run to and fro, or walk round in a circle; or dance and sing, or occasionally vociferate. Others cry or laugh by turns, or almost at the same time, or utter the most unmeaning jargon, or words without ideas, or mutter broken sentences, or expressions without any connection, or evincing the most trivial association, which may depend upon accidental sound, or some sensible object attracting momentary attention. Many sit in silence, with a sedate look, or a vacant smile, or an unmeaning stare, and hardly utter a word for weeks, months, or even years. Some crowd round a stranger and gaze at him, having intelligence barely sufficient to perceive something new; and others have a propensity to ornament themselves in a strange or a fantasticmanner, or to add whatever may be in their way to their dress, which is always singular or ridiculous. A few continue crouched in a particular posture, which they always prefer, though it seems the most un-

easy or painful; and, if placed in a different position, they soon resume their accustomed posture.

157. γ. The disorder of the sensibility and of the understanding is, to a certain extent, pourtrayed in the *countenance*. The features are motionless and devoid of expression. The look is wandering or vacant. The face is pale; the eyes are dull and moistened with tears; the pupils are dilated; and occasionally the features are distorted from relaxation of some of the facial muscles. The body is thin and emaciated in some cases, and full and fat in others. In these latter, the face is full, and the conjunctiva occasionally loaded. In a few, but little indication of mental disorder is evinced by the countenance.

158. δ. The *bodily*, and especially the *organic, functions*, are not materially disturbed. Sleep is sound and prolonged. The appetite is unimpaired, or it is increased almost to voracity. The alvine evacuations are free, sometimes fluid; and in many cases corpulency supervenes. Occasionally, when mania or monomania is about to pass into dementia, the transition is indicated by obesity. When paralysis appears in the course of the disease, the paralytic symptoms manifest themselves slowly and successively. Articulation is first impaired, afterwards locomotion is executed with difficulty, and, lastly, the evacuations become involuntary. But this complication is only contingent, and as such will be noticed hereafter.

159. ε. The *course* of dementia is occasionally *acute*, but much more commonly it is *chronic*. It is *simple*, or *complicated* in the manner about to be noticed. It is generally *continued*, but it is sometimes remittent, or even intermittent. Its duration is most various, from a few days or weeks, to many years.

160. *b*. The *Diagnosis* of dementia cannot be difficult, excepting at the time when mania or monomania is passing into this state; and then the symptoms will indicate the predominance of either. Maniacs and monomaniacs are carried away by false sensations and perceptions, by illusions and hallucinations, by the excitement, the exuberance, and the determined character, of their ideas and of their emotions: the demented person neither imagines nor supposes any thing: he has almost no ideas; he neither wishes, nor determines, but yields to every the slightest impulse or suggestion: his cerebral power is exhausted. In the maniac or partially insane, every thing announces power and strong effort; whilst, in the demented person, every thing betrays relaxation, feebleness, or complete mental impotence.

161. *c*. The *Causes* of which dementia is more especially the consequence, are either moral or physical; but the two orders are often associated, or the one is accessory to the other, in their operation.—*Moral causes* affect females more frequently than males, and the higher than the lower ranks of society; but are much less influential in occasioning this than the other forms of insanity. They are chiefly — excessive or frequent excitements of the passions, domestic unhappiness, political commotions, frights, sudden grief or joy, disappointed affection and ambition, misfortune and want.—*Physical causes* are the most concerned in occasioning this species of insanity. The progress of age, fevers with cerebral determination or predominant affection, congestion and chronic inflammation of the brain and its membranes, the cessation and disorders of the catamenia, are the most common of this class. After these follow — masturbation and venereal excesses, the abuse of intoxicating liquors and of narcotics, the excessive use of mercurials, parturition and the accidents consequent upon it; epilepsy, apoplexy, palsy, injuries of the head, and excessive or prolonged mental exertion, especially when prematurely commenced, or before the brain is duly developed, suppression of cutaneous eruptions, of gout or rheumatism, and of accustomed discharges, have likewise caused, or contributed to cause, dementia. This species of mental disease is, however, most frequently consequent upon mania, or some one of the several forms of partial insanity, especially when these have been treated by too large sanguineous depletions, or by other too active and lowering means.

162. Hereditary conformation or influence, the phlegmatic and lymphatic temperaments, debility caused by irregularities and excesses, and exhaustion of cerebral power by these or by inordinate indulgence of the passions, weak, timid, or irresolute constitutions of mind, and original feebleness of the intellectual powers, *predispose* to dementia.

163. *d*. The *Prognosis* of dementia is extremely unfavourable, especially as respects the more severe cases. In the milder states or stages of the malady, a few instances of recovery occur, especially when a paroxysm of acute mania supervenes. The apparent reaction of the system is, in these cases, sometimes followed by perfect rationality. Attacks of fever attended by delirium are often fatal to lunatics; but of those who recover from them, not a few have their faculties restored to them. When the physical health of persons in dementia improves at a time when the mental disorder seems to be increasing, and especially if they eat, sleep, and digest well, and become fat, recovery may be almost despaired of. If any of the *complications* about to be noticed take place, recovery can no longer be anticipated. Even in this state, patients may linger for many months, or even years, until carried off, by the extent of cerebral lesion, or exhausted vital power, or by the complications of the malady, or rather by the organic alteration on which the complications more immediately depend.—The *changes* found on dissection of fatal cases will be described hereafter.

164. C. Fatuity, or *Annihilation of the Powers of Mind*. — This may be viewed as the last stage, or an extreme degree of dementia, but it sometimes follows almost immediately upon mania or some one of the forms of partial insanity. — *a*. In this state, all the mental powers, and even most of the animal instincts, are lost. The individual continues to possess a state of organic existence, but deprived of all the functions of the brain, and nearly of all the functions of sense. He is scarcely conscious, evinces little or no desire or aversion; is often unable to control, or is not cognisant of, the calls of nature. One stands in a state of vacant unconsciousness; another sits rocking himself to and fro, or yelling or chanting unmeaning words; a third is quite motionless, with his head hanging on his breast, or with his eyes and mouth half open. In this state, the patient is often destitute of the feelings of hunger or thirst, and occasionally even of that of pain. He may linger in this condition for years, but he can never altogether recover from it. A few may be roused, by favourable circumstances, to a less extreme state of mental

annihilation than I have described, — to a state of dementia above this in the scale of intellectual privation, — but a relapse always occurs after a short time.

165. *b*. Fatuity is often *complicated* with partial or general paralysis; and, occasionally, attacks of convulsion or of epilepsy take place, and sometimes terminate this state of existence. In most instances, and especially when fatuity is complicated, the countenance assumes a peculiar character, owing to the absence of all action in the muscles of the face, to the general relaxation of the features, and to the laxity of the integuments of the cellular tissue. The whole frame indicates, by a flabby state of the tissues, the exhausted condition of cerebro-spinal nervous power. — The organic functions are generally but little disordered, excepting as respects the processes of excretion. Owing to defective voluntary control, and the unconscious state of evacuation, the patient often presents a state of disgusting filthiness, difficult to be prevented, and requiring strict attention, in order that the consequences to which neglect uniformly leads may be warded off.

166. ii. COMPLICATED INSANITY.—The several forms of insanity — of the partial as well as the general disease — are often variously complicated. Not only may the different varieties of partial insanity be associated in numerous modes; but general insanity may present, especially when consequent upon monomania, a predominance of disorder as respects certain ideas, feelings, or trains of thought. I have already shown, that moral insanity often passes into disorder of the understanding; and that, in such cases, not only both states of derangement subsist, but some additional disorder, in many instances, is at last superadded. Thus, states of general alienation, more or less complete, are often ultimately developed, presenting either of the states of mania or of dementia, often with prominent disorder on certain subjects, or a disposition to entertain certain emotions or ideas in preference to any other. These states of alienation, however, can hardly be denominated complications, inasmuch as they are various modes in which the mental disorder generally goes on increasing, when uncontrolled by treatment, until the powers of mind are altogether overturned, or even annihilated. The morbid associations, therefore, to which I now proceed to direct attention, are strictly complications, or contingent associations of bodily disease with insanity, and are of so frequent occurrence, and of so great importance in regard of the course and termination of the cases in which they are observed, as to require a particular notice. The circumstance, also, of the mental disorder, and the contingent bodily disease, generally proceeding from a source common to both, — from derangement of the circulation within the cranium, and often from organic lesion, either intimate and hardly appreciable, or gross and obvious, — also demands a more special consideration of this subject.

167. *A*. The COMPLICATION WITH GENERAL PARALYSIS is the most common and the most important of any that occurs in practice. I have already fully described its different *stages* or *degrees* (§ 33. 36.), and shall notice, at this place, certain particulars only that did not fall within the scope of that description. This form of paralysis is often indicative of chronic inflammation of the meninges, and is distinct from the paralytic affections consequent upon cerebral hæmorrhage, or upon softening, tumours, &c. of the brain,— which, however, may also be complicated with insanity, although much more rarely than the general form of the affection above described. It, in a few instances, precedes, and in most supervenes upon, the mental disorder. It sometimes appears with the first symptoms, or during the acute period, of insanity; and generally commences in the manner I have stated (§ 33.), and increases as the mental powers diminish. Whatever form the mental disorder may have presented, it soon passes into chronic dementia, when complicated with paralysis. It generally terminates the life of the patient within three years; death being preceded by cerebral congestion, convulsions, diarrhœa, and gangrene of those parts sustaining the weight of the body when muscular support has been lost. This form of paralysis is much more frequent in men than in women. Of 109 insane paralytics under the observation of M. ESQUIROL, during three years, at Charenton, 95 were males. Of 609 lunatics admitted at this institution, in three years, 109 were paralytics; — the proportion in males and females being — in 366 male lunatics, 95 were paralytics; and of 253 females, 14 were thus affected. Of 334 lunatics in the Asylum of St. Yon, near Rouen, 31 were paralytics, — of whom 22 were men, and 9 women. At the Bicêtre, the proportion of paralytics to the number of lunatics is much smaller. It is observed by M. ESQUIROL, that this complication occurs most commonly in those lunatics who have caused their insanity by venereal excesses, by intoxication, by the abuse of mercury, and by mental exertion,— circumstances which account for the greater prevalence of it in males than in females. The lunatics at Charenton, where it is most frequently observed, have been in easy circumstances, and have possessed means of gratifying their passions, or have exercised professions which have excited or over-exerted the brain, without duly exercising the body.

176. According to M. CALMEIL, this affection has generally, at Charenton, appeared soon after the commencement of insanity; but it sometimes has not occurred until insanity has continued for many years. A few individuals have displayed all the vigour of intellect for some time after they were attacked by it, and derangement has afterwards taken place. If the mental disorder has not already proceeded, it very rapidly proceeds, in this complication, to advanced or complete dementia; yet persons thus affected preserve their appetites, or have them greatly increased. They are in all other respects in health. The circulation is natural, and the sleep undisturbed. They continue plump, but the soft solids are flabby and soft; and, as the disease proceeds, they are liable to constipation, often followed by diarrhœa, by unconscious evacuations, and by want of power over them, owing to palsy of the sphincters. Retention and incontinence of urine generally also take place, and aggravate the evils to which the paralytic person is liable.

168. *a*. The *duration* of this complication is various; but is reckoned by MM. ESQUIROL and CALMEIL to average about thirteen months; very few surviving longer than three years with it.— The ultimate *prognosis* is most unfavourable. M. ROYER-COLLARD, after an experience of twenty

years, had not met with one instance of recovery from it. M. CALMEIL has seen only two cases, thus complicated, that recovered; and M. ESQUIROL has mentioned only three. The appearances observed after death will be stated hereafter.

169. General paralysis is apparently more frequent in Paris than elsewhere. There can be no doubt, however, that it has been more accurately observed amongst the insane in that city, and indeed through many parts of France, than elsewhere. Dr. BURROWS had stated it to be comparatively a rare disease in England. M. ESQUIROL doubted this, and inferred that it was considered rare, because it it had not been accurately observed in this country. There is much truth in this, as shown by the recent inquiries of Dr. PRICHARD. This physician states, that he had made many inquiries with a view to determining this question, but had met with considerable difficulties in obtaining satisfactory information. The facts, however, which he has adduced, prove that this is a frequent complication of insanity in this country, although not so frequent as in Paris; and in every respect confirm the accuracy of the observations furnished by MM. ESQUIROL, CALMEIL, and other French pathologists.

170. *b.* There is a modification of paralysis, as Dr. PRICHARD truly remarks, of frequent occurrence, during protracted insanity and dementia, in English hospitals for lunatics, that differs in duration, and in some of its features, from the general paralysis so accurately described by the French writers. It resembles the debility or decrepitude of extreme old age. Patients affected by it, sit crouched with their heads hanging down; and when they attempt to raise themselves into the erect posture, their limbs tremble, they stoop, and totter. Some stand leaning against a wall for whole days, with their bodies curved forward, their heads and necks hanging down, and their upper extremities shaking and hanging useless. Such patients are always in the most advanced stage of dementia, and often continue in this state of paralytic decrepitude for many years. Some become bedridden, and remain long incapable of any voluntary movement, until at length either the powers of life are gradually extinguished, or they are carried off as in the form of paralysis previously described (§ 33.).

171. *c.* Paralysis from cerebral hæmorrhage, from softening, from tumours, or from other organic lesions of a portion of the brain, is also observed in insane patients, but not so frequently as the varieties of this affection already noticed. In these cases, it generally assumes the form of hemiplegia; but it sometimes continues in a partial or limited state,—being confined to one arm, or to the muscles of one side of the face, or to the arm and face, for a considerable time. It may even proceed no further, although more commonly it passes into palsy of the whole side. In these the attack is gradual, slow, and *chronic;* and usually proceeds from softening, or from some other change of structure, in a portion of the brain or of its membranes. In other cases, the paralytic affection is more sudden and *acute,* and is consequent upon an apoplectic or comatose state, or upon an epileptic or convulsive seizure. It may be at at once hemiplegic; or it may be at first more partial, and become more complete, either gradually, or after relapses or repeated attacks of sopor or convulsion. This more acute form of palsy seems to proceed from congestion or sanguineous effusion in the brain; but it has occurred without any organic lesion having been found to account for it. (See *Appearances in the Brain, in Paralytic* INSANITY.)

172. The more usual forms of paralysis may precede the insanity; but they most frequently take place in the more confirmed and chronic states of mania, and especially in dementia and fatuity. They are evidently more or less intimately connected with the pathological conditions upon which insanity depends, as well as with the consequences which these conditions produce, as will be shown hereafter. Whilst palsy in the insane is generally incurable, insanity is equally so when thus complicated.

173. *B.* VERTIGO, or *Giddiness,* often precedes and accompanies insanity. The two forms of vertigo — the one from active congestion of blood in the brain, the other from a defect of the supply of blood to this organ — may attend mental diseases. It is extremely necessary to distinguish between these two opposite conditions of the cerebral circulation, with reference to this affection. When vertigo proceeds from the former state, it is characterised by a sense of rapid gyration in the head, by throbbing in the temples, a beating noise in the ears, succeeded sometimes by vomiting or nausea, and occasionally by loss of consciousness: when it arises from the opposite condition of the circulation, it resembles a gradual swimming,—objects appearing as approximating, or receding from, the organs of vision, or becoming dark, — and is attended by a sense of faintness. It is requisite to attend to these two very different forms of vertigo, inasmuch as they indicate important and opposite states of the cerebral circulation; and, as in the more partial forms of insanity, they often precede the accession of mania, or the occurrence of some dangerous complications.

174. *C.* EPILEPSY and CONVULSIONS are frequent complications of every variety of insanity. Either of these affections — either the regular paroxysm of epilepsy, characterised by sudden loss of consciousness, frothing at the mouth, injury of the tongue, and subsequent sopor; or the more gradually developed fit of convulsion, in which these phenomena are not present — may precede or follow the mental disorder. In every instance, congestion or determination of blood to the head becomes remarkable during the paroxysm, although there may have been a deficient supply of blood to this quarter shortly before. The occurrence of these complications is generally owing to insolation, to suppression or disorder of the catamenia, to violent excitement or exercise, especially during warm weather, to injudicious bathing, to the use of intoxicating liquors, to venereal excesses and masturbation, to habitual gluttony or excesses at table, and to the other causes enumerated in the articles on these diseases. Epilepsy occurs most frequently in those who have complained of vertigo, headach, incubus, and of restless dreaming sleep; and an attack is generally preceded by some of these symptoms, or by an aggravation of mental disorder.

175. Insane persons, predisposed to epilepsy or convulsions, as well as epileptics disposed to insanity, generally present a peculiar prominence of the eyes, sometimes with a puffy or wrinkled state

of the surrounding integuments, partly arising from congestion of the blood-vessels, and particularly of the veins, in the vicinity. This is observed also in mania, and still more so in epileptic mania. The eye also has a kind of glaze over it, distinguishing it from the convex eye of near-sighted people.

176. When an attack of epileptic or other convulsions is followed by mania, or any other form of mental disorder, the latter often disappears, sometimes in a few days or weeks, under judicious treatment; but it always returns with the convulsive affection, — and after repeated attacks, the mental disorder becomes more severe, more general, as respects the mental powers, and more confirmed, until the patient rapidly sinks into dementia or fatuity, in which state apoplexy, or some one of the forms of palsy, is sometimes superadded. In this case, life is terminated, after an uncertain time, either by a paroxysm of convulsion, or by one of the later complications. Although epileptic mania generally pursues this unfavourable course, when neglected or injudiciously treated, yet it sometimes admits of alleviation, or even of cure, when judiciously managed. — When epilepsy or convulsions occur in the course of any of the more chronic forms of insanity, the latter is very rarely cured; if death does not take place soon, it lapses into complete dementia or fatuity.

177. Mania complicated with epilepsy is characterised by ferocious, malign, and often murderous paroxysms, or exacerbations, which frequently take place most suddenly. The fury of the patient is sometimes directed against himself; but oftener against others, especially those he most loves when sane. Dr. Burrows observes, that when paroxysms of mania suddenly attack persons subject to epilepsy, a reckless fury is exhibited by them, different from the characters of true mania. It seems as if the epileptic impulse, when not ending in convulsion, acts upon the brain in a peculiar mode, imparting to it that particular action denominated epileptic mania. The most horrible actions have proceeded from this complicated form of insanity. Sometimes the destructive paroxysm or impulse is produced by some fanatical opinion or idea, prompted by a misconstruction of some scriptural passage, by some delusion, or waking dream. Persons thus affected may have lucid intervals of considerable duration. But although the paroxysms are sometimes preceded by some signs or symptoms, yet they are often so sudden that mischief is occasionally done before it can be prevented. Hence epileptic maniacs should not associate with other insane persons, — and especially as the sight of epileptic paroxysms may produce the like in other maniacs. The appearances observed after death in epileptic and convulsive insanity will be noticed hereafter.

178. *D.* Apoplexy may be the *cause* of insanity, or it may be the *consequence* of those intimate lesions of structure which either occasion, or are connected with, the mental disorder. Esquirol considers that apoplexy constitutes a sixth of the physical causes of mental alienation, and an eighth of the deaths. Dr. Burrows thinks, that it is not so frequently a cause of insanity, or of death, in this country, as M. Esquirol states with reference to France. When apoplexy is connected with the production of insanity, it is generally congestive or hæmorrhagic; and, in the latter case, is generally followed by paralysis, — the mental disorder being complicated with hemiplegia, or with a more partial form of palsy. Apoplexy with effusion of blood generally occurs early in the mental disorder, and commonly in the maniacal form. When apoplexy precedes mania, there is often a great change perceived in the moral and intellectual character, for some time before the attack. Dr. Burrows justly remarks, that this change in the character may usher in an apoplectic as well as a maniacal paroxysm; and hence the affinity between sanguineous apoplexy and mania is evident.

179. The sudden deaths, however, which take place in chronic mania, and in confirmed dementia, and in the complication of insanity already noticed, are seldom produced by cerebral hæmorrhage. They were formerly ascribed to *serous* apoplexy; but as I have shown (see Apoplexy, § 115.) that the form of this disease, usually imputed to the effusion of serum, depends rather upon exhausted organic nervous power, in connection with congestion, or interrupted circulation of the vessels of the brain, than upon effusion, — which, even when present, is seldom in such quantity as to account for the fatal event, — so it may be inferred that sudden deaths in these chronic forms of general insanity are chiefly owing either to congestion, or exhaustion of nervous power. The fatal attack either commences with sudden or profound coma, which is soon followed by convulsions; or it begins with convulsions, which are soon succeeded by coma, rapidly terminating in death, — the apoplectic or the convulsive state being thus consecutive, or both, in a few instances, being simultaneous. Either of these forms of attack is often immediately consequent upon a paroxysm of furious mania, or of delirious excitement; and, in some cases, a state of acute or furious delirium, or of insane agitation, terminates at once in death, without convulsions or coma — at least, of any appreciable duration — having preceded the fatal event. This termination, which may be viewed as a form of apoplexy, has been noticed by Pinel, Esquirol, Burrows, and others, who have described it as occurring only in old and cachectic cases, and as being preceded by a sudden accession of maniacal or delirious excitement, which soon ceases, and the patient dies, as if from exhaustion of vital energy. On dissection, but little is found in the brain to account for the event; and the body soon passes into putrefaction. These forms of apoplectic attack are identical with those which I have ascribed, in the article Apoplexy, to exhaustion, or loss of the organic nervous energy of the brain, — a state formerly noticed by Boerhaave, and designated by him *Apoplexia defectiva*.—It is probable, however, that, in the cases of insanity, in which the sudden death is consequent upon distinct evidence of general cachexia, the event is caused rather by sudden privation of power in the heart, or by sudden congestion of the lungs, or other affection of these organs, than by loss of the nervous energy of the brain.

180. A state of profound and continued *coma* occurs in the course of a few cases of insanity. It may follow mania; and I have seen it, in one instance, consequent upon moral insanity. I believe that it takes place chiefly in those states of mental disorder which have been produced by depressing

causes. The two cases which I have had an opportunity of observing, have been prolonged, and evidently owing to exhaustion of the vital manifestations of the brain. Restoration took place from this state, but the powers of the mind were never, even partially, recovered. The *apoplectic* and *comatose* complications, especially of chronic mania, of dementia, and of fatuity, — particularly when terminating quickly in death, or characterised by sudden collapse or exhaustion of nervous power, — occur most frequently in winter and during cold weather, and are occasioned chiefly by causes which depress or exhaust the powers of life.

181. *E.* HYSTERIA, CATALEPSY, and CATALEPTIC EXTASY also occasionally precede, and occur in the course of, insanity. The two latter affections, however, are rarely met with, but have been observed by HALLER, BOERHAAVE, LIEUTAUD, TISSOT, PARRY, BURROWS, and myself, — chiefly, however, as antecedents of insanity. Hysteria is observed most frequently at the commencement of mental disorder; and it sometimes passes into a state of moral or partial insanity, which after a time subsides. Hysteria is often associated with hypochondriasis; and both when thus associated, and when severe and prolonged or habitual, insanity is occasionally consequent upon, and subsequently more or less manifestly complicated with, it. It is of the utmost importance, in practice, to recollect the connection, when females come under treatment. In these cases, the mental disorder, as well as the hysterical affection, proceed from a common source: uterine irritation or disease is propagated to the cerebro-spinal nervous system, and the functions of the brain are consequently more or less disturbed.

182. *F.* DISORDER OF THE DIGESTIVE AND ASSIMILATING ORGANS very generally *precede* and *complicate* disorders of the mind. I am persuaded, that much too little importance is attached to this circumstance, in respect both of the pathology and treatment of insanity. The organic functions are often generally deranged — commonly more or less weakened — long before the mind is affected. Digestion is impaired, although the appetite may be natural or even increased; and the bowels are generally torpid, and require large doses of purgatives to act upon them. They are sometimes irregular, from irritation of the digestive mucous surface having reached a considerable pitch, or from the presence of offending matters. The secreting and assimilating functions of the liver are likewise impaired; — the bile is either scanty, or retained in the ducts or gall-bladder, until it acquires irritating and morbid states; and the vital influence of this organ on the venous blood circulating through it is insufficiently exerted. Hence the chyle is imperfectly prepared, and the blood abounds either in unassimilated elements, or in materials which require to be eliminated from it. To these circumstances especially are to be attributed much of the disorder consecutively observed in the functions of the brain, of the lungs, and of the heart; and, at length, many of the organic lesions of these organs, which complicate, and ultimately terminate, the more severe cases of mental disease. The general *cachexia* often preceding insanity, and still more manifestly attending it, is the result of the morbid states of the chyle and blood consequent upon deficient organic nervous energy throughout the digestive and assimilative organs. Many of the structural changes, as well as the scorbutic state of the body, which very often take place in the more chronic cases of insanity, proceed from the morbid conditions of the fluids, consequent upon this impaired state of nervous power.

183. BROUSSAIS, and most of his followers, have attributed the disorder of the digestive organs preceding and attending insanity, to *chronic inflammatory irritation of the gastro-intestinal mucous surface;* and have even considered the mental affection to be frequently symptomatic of, or caused by, the disorder of this surface. Without disputing the occasional presence of chronic gastro-enteritis, both previously to, and associated with, mental derangement, I believe that, when it is present, it is chiefly contingent upon the state of organic nervous influence just contended for, and upon the irritating state of the contents of the alimentary canal, arising out of imperfect digestion, and a morbid condition of the secretions poured into it. This subject, however, will be further noticed hereafter.

184. *G.* There are *various other diseases* which arise in the course of insanity — or are contingent upon it, — and which even cause its fatal termination in many instances. The chief of these are consumption, diseases of the bowels, scurvy, organic lesions of the heart, dropsical effusions, gangrene, &c. These are actually complications, inasmuch as the mental disorder generally proceeds in connection with them for a longer or shorter period, and as they have little or no influence in terminating the mental disorder otherwise than in death. Some of them, particularly diseases of the lungs and pleura, may suspend it, or cause it to intermit, but they have no further influence over it, of a beneficial kind. They, however, often tend to aggravate it, or to cause the slighter and more partial forms to pass into those more general and severe. I shall notice them further in the following chapter.

185. IV. TERMINATIONS OF INSANITY. — i. PROGNOSIS. — Insanity terminates either in *recovery* or in *death;* but it may be said to terminate otherwise, when one variety lapses into another, especially into one of a severer or more complicated form, or when one alternates with another. Although this transition of one state of disease into another closely allied to it, cannot be strictly considered as a termination of it, yet it requires notice, as possessing great practical importance. Much of the information upon which opinions are to be formed as to the results of mental disease, is furnished by the statistics of lunatic asylums — sources of notorious inaccuracy in this country, especially up to a very late period. Much of this inaccuracy arises from the regulations by which those institutions are governed, — from the classes of patients which they receive or reject, — and from the periods their inmates are allowed to remain under treatment. Many recent cases, both acute and slight, are treated in private practice, and recover in a short time, which do not come into any account either of the number affected, or of the number cured. The systems of treatment pursued in different asylums, public and private, and in states of individual seclusion, are so diversified, — in many instances, most inappropriate — in some, calculated to aggravate and perpetuate the malady — in others, altogether inert — in numerous

cases, without the least reference to very manifest physical disorder, characterised by obvious symptoms and signs — and in not a few, without regard to intellectual or moral guidance, — that numerical results obtained from these sources may flatter those who rejoice in a parade of precise details, without considering the soundness of the data upon which they are calculated, or the fallacies which are involved in them, or the unsound inferences which they encourage and propagate, but can never satisfactorily inform those who look for instruction from unexceptionable, and from, at least, tolerably instructed, quarters. In a country, where the institutions — public and endowed as well as private and mercenary — for the greatest and most humiliating of human calamities, are shut against professional instruction, — where these institutions, and those to whom their medical management is intrusted, furnish the least possible modicum of professional information, — where asylums are made more for the profitable and safe custody of the inmates, than for their recovery, — what can be hoped from statistical and numerical statements, but mystification, if not positive deception. Whilst, therefore, I adduce such information as I can obtain, I give it with due note of its imperfections, that it may not be estimated above its real value. There are, however, some sources — especially those to which most frequent reference is here made — that deserve somewhat more of confidence than should be reposed in many others.*

186. *A.* The Duration of insanity is most various. The disease has subsided, in some cases, within a few days from its commencement; in others, it has continued for twenty, thirty, or even forty years. — *Recoveries*, as well as *deaths*, occur at all periods from the commencement of the malady. If neither of these events takes place at a somewhat early period, confirmed insanity generally succeeds, and sooner or later assumes the form of dementia, and sometimes ultimately passes into a state of fatuity. In this case, the malady goes on until it terminates in *death*, which takes place either in its simple or complicated states.

187. *B.* Recovery is the result in a large proportion of cases of insanity; but the proportion varies remarkably in the several forms and complications of the malady. It is very important, in respect both of the history and classification of the disease, and the *prognosis*, to determine, as accurately as possible, the number of cures in a given number of cases. But before the general results furnished by the imperfect sources already alluded to, or the estimates made from the reports of lunatic institutions, be at all considered, it will be preferable to take a view of the several circumstances which influence the event of the malady, but which vary in character, in combinations, and in their effects, in different countries, climates, places, and asylums. These circumstances are — the particular kind of mental disorder; its causes, predisposing and exciting; its duration, continuance, or recurrence; its existence in a simple or in a complicated state; the physical disease with which it is associated; and the age, sex, constitution, occupation, &c. of the patient.

188. *a.* The *form of the disease* has a marked influence upon its curability. M. Esquirol states that a greater proportion of the cases of mania is cured than of any other form of madness, and that dementia is scarcely ever cured; but, of 518 recoveries at Charenton during eight years, the numbers were — 263 cases out of 545 of mania; 251 out of 715 of monomania; and only 4 out of 281 of dementia. But of the aggregate of 1557 cases, there were 274 paralytics, 62 epileptics, and 15 idiots; so that the curable cases were 1205, and of this number upwards of two fifths were cured. He further remarks, that the greater sanability of maniacs comparatively with monomaniacs had place chiefly in males; monomania being, from this, more curable in females than in males. The following table will give a more precise idea of the results obtained by M. Esquirol at Charenton: —

Form of Disease.	Male Cases.	Female Cases.	Total Cases.	Males recovered.	Females Recovered.	Total recovered.
Monomania -	372	343	715	123	128	251
Mania - -	334	211	545	160	103	263
Dementia and Fatuity -	227	69	296	1	3	4
General Total -	933	623	1556	284	234	518
Deduct Incurable Cases -	-	-	351			
	-	-	1205	-	-	518=1 : 2·34

189. *b.* The *causes* have a manifest influence upon the event in mental disorder. But they are so variously associated in producing their effects, that it is very difficult to advance any precise statement on this topic. Hereditary predisposition, and the more powerful physical and moral causes, especially when combined, must be viewed as unfavourable circumstances. Indeed, all the causes which I have enumerated as especially influential in occasioning dementia may be considered in this light.

190. *c.* The *age*, *sex*, and *constitution*, of the patient are material considerations in forming a prognosis. — The most favourable *age* for recovery is between the 20th and 30th year. But few recover after the 50th year. M. Esquirol states, that, of 209 recoveries at Charenton, the greatest number of cases were from the 25th to the 30th, and from the 30th to the 35th year. This is the period of greatest vital energy, when acute mania oftenest occurs. Recoveries diminish progressively from the 45th year. The diminution is more abrupt in females, and more gradual in males. Twenty men, however, recovered after the 50th year, in which number were 4 out of 12 lunatics who had exceeded 70; so that advanced age does not preclude hope.

191. Insanity is, generally speaking, more curable in *women* than *men*. When it is evidently connected with a condition of the natural functions which is susceptible of change by medical art, or by the efforts of nature, or the progress of age, a hope of cure may be entertained on these grounds. Thus recoveries have often taken place in females at critical periods. M. Esquirol men-

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* On this subject, as well as on many others connected with insanity, much interesting remark will be found in an able analytical article in the 13th No. of the *British and Foreign Quarterly Review*, which came before me after a great part of this article was sent to press. It is at least consolatory, that the able author of this paper, and of an excellent work on Insanity, should be placed over the County Asylum.

tions instances of dementia in females which had continued from early youth, and had terminated on the appearance of the catamenia; and others which had commenced at that period, and had recovered when the catamenia ceased. When the disease has followed the suppression of an eruption or of an accustomed discharge, a cure may be hoped for, by re-establishing the suppressed evacuation or eruption, or by means which have a similar effect upon the constitution.

192. *d.* The previous *duration* of the disease has a marked influence upon the curability of it. The chance of recovery is very much greater in the early than in the advanced periods. Dr. Willis stated that 9 cases out of 10 were restored when they had been placed under his care within three months from the commencement of the attack; and Dr. Finch has declared that 61 out of 69 patients recovered who were received into his asylum within the same period from the appearance of the malady. Dr. Burrows, in his very excellent work, has reported 221 cures out of 242 recent cases. Dr. Prichard remarks, that 7 out of 8, or even a larger proportion, of recent cases have terminated successfully in the Retreat near York. This is as favourable a view of the result in recent attacks as can be entertained; and yet, when we consider that many recoveries from mental disorder take place in private practice without becoming known, and that the great majority of those cases which are admitted into institutions or asylums are either of some duration, or second or third attacks, or have withstood the treatment that had been adopted, it cannot be considered as being much too favourable as respects all very early states of this malady.

193. M. Pinel was the first, or amongst the first, to direct attention, by a memoir read at the National Institute in 1800, to the degrees of probability there existed of recovery at different periods of insanity. This eminent physician inferred, that a greater number of recoveries take place in the first than in any other succeeding month; and that the mean duration of the malady, in cases of recovery, is from five to six months. According, however, to M. Tuke and M. Esquirol, the mean duration of these cases is somewhat under one year. I believe that M. Pinel's conclusion is more correct as regards all instances of recovery, and especially as comprising recent cases, many of which are not comprised in the accounts furnished by public institutions; whilst M. Esquirol's inference is applicable chiefly to these and similar institutions. This writer states, that of 2005 female lunatics, 604 were cured during the first year, 497 in the second, 86 in the third, and 41 in seven succeeding years. From the tables furnished by him, and by Mr. Hitch, of the Gloucester Lunatic Asylum, to Dr. Prichard, as well as from other data, it may be truly inferred, that recovery is probable in proportion to the shortness of the duration of the malady. The importance of proper treatment at an early period, and the impropriety of sending a patient hurriedly off to a house of confinement, with no assurance of a proper system of treatment being persevered in, is very evident from these data, as well as from numerous other considerations. — A recent writer justly remarks, that cases are not wanting to prove, that the mind may recover even after many years have been passed in a state of insanity; and that such cases have sometimes been overlooked or concealed, there is too much reason to suspect. Instances are adduced by MM. Beaumes, Esquirol, and Chambeyron, in which recovery took place after madness had continued for twenty years, or even longer,— especially upon the establishment of a natural, or of a suppressed discharge, or of suppuration, or some extensive counter-irritation or evacuation. From Mr. Hitch's tables it would appear, not only that the greater number of cures occurred in recent cases, but that, in some, recovery took place in a short time after admission, although the disease had been of long anterior duration. Of five patients, insane for ten years, one was cured in nine months, one in ten months, the third in a year, and the other two in six months; and one who had been insane forty years was cured in four months. Three other cases recovered after eleven, seventeen, and twenty years. These facts are sufficient to prove that, from the long duration of the disease alone, recovery is not altogether to be despaired of.

194. *e.* The *complications of insanity* very remarkably influence the terminations of it. The association of any of the forms of the disease with general or partial *paralysis*, and of dementia especially with general palsy in any grade, is a most unfavourable circumstance, — recovery hardly ever taking place, as shown above (§ 168.), in any of these cases. — The complication with *epilepsy*, or *convulsions*, is also most unfavourable. When mania is consequent upon severe attacks of epilepsy, or when the maniacal affection is very violent in the intervals of these attacks, few or no hopes of recovery should be entertained. When, however, convulsions appear during the high excitement of mania, a somewhat more favourable opinion of the event may be formed. — The antecedence, or supervention, of *apoplexy*, or of *coma*, is a circumstance admitting of as few hopes as the preceding complication. — The occurrence of *phthisical symptoms*, or of obstinate *diarrhœa*, in the course of the mental disorder, especially when the latter is not followed by amendment, generally indicates a more or less speedy termination in death.

195. *f.* The *seasons* have a slight influence on the issue of insanity. Mania is more frequently cured in summer and autumn. The month of October presents the greatest number of recoveries; the month of February the fewest. Males are more frequently cured in July and November, females in October and May. Of 518 cures, M. Esquirol found, that 92 took place in winter, 123 in spring, 145 in summer, and 158 in autumn.

196. *g. As to the proportional number of recoveries in various countries and places*, great differences are found to exist; depending chiefly upon the restrictions, or the latitude, observed in public institutions, as to the admission and retention of patients. Dr. Burrows states, that 240 cures were affected, in his practice, in an aggregate of 296 cases of various kinds; 221 recovering out of 242 recent cases, and 19 of 64 old cases, or 81 in 100 of all cases, and 91 in 100 of those which were recent — a proportion much greater than that furnished by any other source; but very nearly agreeing with the statements of Dr. Willis. Dr. Jacobi considers that this high proportion can be explained only on the supposition that many patients were dismissed as cured upon the first appearance of amendment, or before recovery had

been fully established. He states, that in the asylum under his management, only 40 cases completely recovered out of 100, and six were alleviated. M. Esquirol states, that of 5360 admissions into French hospitals, 2691 were cured; and in the *Memoirs of the Academy of Medicine* (vol. i. p. 40.) he observes, that 4968 were cured out of 12,592 admitted into the Salpêtrière and Bicêtre, many of whom were idiots, epileptics, and paralytic, and fatuous aged persons. The same writer assigns 5918 recoveries to 16,516 admissions into English lunatic asylums. From this it would appear, that the proportion of cures formerly obtained in English institutions for the insane is much less than that furnished by the French hospitals. Dr. Prichard remarks, that this is the more remarkable, considering the peculiar regulations of Bethlem and St. Luke's.—These hospitals present restrictions unknown elsewhere. They reject all who have been more than a year insane; also those affected by paralysis, epilepsy, or convulsions, idiots, the aged and the infirm, as well as those discharged uncured from other institutions; and all persons who have not recovered at the end of one year are dismissed. Yet, on comparing the reports of these hospitals with those of other institutions where no selection exists, the relative number of recoveries is not found to be so great as might be expected. Dr. Burrows states, on the authority of Stowe, who derived his information from Dr. Tyson, physician to Bethlem Hospital, that, "from 1684 to 1703, 1294 patients were admitted, of whom 890 were cured, which is a proportion of more than two in three. But from 1784 to 1794, 1664 patients were admitted, of whom 574, or rather more than one in three only recovered:—This is remarkable. Dr. Prichard gives, on the authority of Mr. Lawrence, the report of this institution from 1820 to 1833 inclusive; and from that it appears, that the total number of admissions were 2445, of whom 1124 were cured, 643 were discharged uncured, 70 at the request of friends, 385 as improper objects, and 99 died. Deducting the 385 subsequently excluded, the 2060 furnished 1124 cures, or considerably more than one half.

197. In the following hospitals, where no selection of cases is made, the proportion of cures is — 43 in 100 in the Stafford Asylum; 42 in 100 in the Wakefield County Asylum; 40 in 100 in the Lancaster County Asylum; and about 48 in 100 in the Gloucester Asylum. The following table, furnished to Dr. Prichard by Mr. Tuke, gives the admissions and the results in the Retreat near York, from 1812 to 1833 inclusive: —

Classes of Cases.	Number admitted.	Recovered.	Died.	Removed.	Removed improved.	Remain.
1. Cases of less than three months' duration -	63	51	8	1	2	1
2. Cases of more than three, and less than twelve, months' duration - - -	65	28	10	6	3	18
3. Cases of more than twelve months' duration - - -	101	31	15	17	4	34
4. Cases of relapse -	105	58	17	13	1	16
Total - -	334	168	50	37	10	69

Mr. Tuke states, that several cases, entered as recent, were properly old cases; and if these were excluded, together with those connected with diseases speedily terminating life, as consumption and apoplexy, the probability of recovery from insanity, in recent cases, is greater than nine to one. An able reviewer very justly remarks on this statement, which is strongly confirmatory of that long since made by Dr. Burrows, that it is deserving of attention, as the opinion generally entertained, in respect of cases even of recent date, is more unfavourable than ascertained facts should warrant; the desponding view taken of such cases evidently tending to relax the efforts which should be made for the recovery of them.

198. *C.* The *particular prognosis*, or *the symptoms especially indicating recovery* from insanity, requires a brief consideration. — *a.* A paroxysm of mania may continue a few hours, or days, or weeks, or longer, and then remit or entirely vanish; or it may assume the form of melancholia, and continue or alternate with mania to its termination. It is impossible to say when either form of insanity will subside: the more furious, however, the attack, the shorter, generally, will be its duration, especially in mania. But when a remission of violence is attended by amelioration of other symptoms, it is a favourable sign. If the malady have continued several weeks, and the system is suffering, the disease will prove obstinate, if not dangerous. Insanity terminates favourably more frequently by a visible decline of the symptoms, and a remission or complete intermission, than by critical discharges. To these last, M. Esquirol attaches too great importance, Dr. Burrows too little, in this disease; for, although alvine, hæmorrhagic, urinary, and suppurative discharges, or boils and cutaneous eruptions, do not certainly remove the mental disorder, even when taking place spontaneously, yet they frequently do remove it. Fevers, hydropic effusions, and gout,—particularly the last,—have also sometimes removed the mental affection. These, however, as well as other diseases, have more frequently been followed by a remission, or, at best, by an intermission only.

199. *b. Remissions*, when thus or otherwise observed, may continue for days, weeks, or longer; but the reason still continues partially deranged, and the sleep disturbed by dreams, or by unpleasant sensations, referrible to the head or senses of sight or hearing; and after a time the disorder resumes its full force. — *Intermissions* are a perfect restoration of the faculties for a time, varying in duration from two or three days, or a month, to several weeks, months, or even years. Sometimes the return of the attack is after regular intervals, or, *periodic*; but as often it is irregular. Insanity may cease after a time, having passed first into a remittent or an intermittent state; or it may disappear, more or less rapidly, and completely, without any return. A gradual and perfect restoration of the faculties, however, takes place in the great majority of cases of recovery, without any recurrence or exacerbation of symptoms constituting the states of disorder just mentioned.

200. *c.* The absence of false perceptions and delusions is a favourable circumstance; but when they continue after the abatement of physical violence, a protracted case may be anticipated. A return of the natural feelings, of the affections, particularly to near relatives, and to former habits,

is amongst the surest indications of recovery. But in all cases, in forming a prognosis, the mental phenomena should be viewed in connection with the physical symptoms and state of the patient, and with such changes in the economy as have usually been viewed as critical in acute maladies, and particularly those affecting the brain or its membranes, — especially the restoration of suppressed discharges, evacuations, and eruptions; or the spontaneous occurrence of these, — as the hæmorrhoidal and catamenial fluxes, epistaxis, diarrhœa, furunculi, a regular fit of gout, &c. The utmost caution, however, should be observed in giving an opinion as to the event; but it is preferable to hold out hopes of recovery as long as there is a chance of it, otherwise the efforts to effect it may relax, and the patient consequently suffer. The following inferences are not materially different from those arrived at by Dr. Burrows and M. Esquirol.

201. 1. A cure is probable in proportion to the youth of the patient.—2. It is also probable in a ratio with the recentness of the attack.—3. The chance of recovery is the greatest in first attacks, and diminishes with each subsequent attack, and with the duration of the disease and age of the patient.—4. Mania is cured most frequently; next, melancholia and monomania; and lastly, and the least, dementia and fatuity. — 5. Melancholia is difficult of cure in proportion to the degree of depression; a dread of poverty, of poison, and perverted ideas of religion, indicating an obstinate disease. — 6. Chronic insanity, whether mania or melancholia, seldom recovers. — 7. The prognosis of puerperal mania is favourable. — 8. Insanity with a propensity to suicide is not unfavourable, if the patient comes early under treatment, and the disease be recent.—9. Acute dementia is curable; but chronic demency and senile insanity are never entirely cured. — 10. Hereditary predisposition protracts, somewhat diminishes the chances of, but does not prevent, a cure: relapses and recurrences are, however, more to be expected where it exists.— 11. When the insane are capable of judging rightly of their own state, a cure becomes difficult. — 12. An amendment of personal appearance, attended by an improvement in the mind, is indicative of recovery. — 13. When the insane preserve or acquire all their physical functions, and eat and rest well, and present their usual appearance, without recovering their faculties, recovery is hopeless. — 14. Insanity caused by excessive study, by the slow operation of moral emotions, or attended by hallucinations, by pride, &c., is seldom cured. — 15. Complications with palsy, and apoplexy, are incurable, and are fatal ultimately: but those with epilepsy, or convulsions, may recover in very rare instances. — 16. Men are more liable to relapses than women; one half of all relapses occurring in the first three months after recovery.

202. ii. Of Relapses and Recurrences of Insanity. — Recoveries from insanity are either *complete*, or *incomplete*. Of the latter, there are many, who, although perfectly rational, are never capable of returning to the sphere they formerly occupied, or of performing the duties which they previously fulfilled; their faculties having sustained a shock which can never be altogether recovered from. Dr. Prichard considers such cases to be about one tenth of the recoveries. Others remain longer or shorter in such a state of susceptibility that the slightest causes occasion *relapses*; and they preserve their sanity only by continuing to live where no mental agitation or inquietude is likely to befall them, and throw them back into their former state.

203. *a*. A *relapse* may be said to occur, when the malady returns, whilst the patient has scarcely, or very recently, recovered, or when he is only in a state of convalescence. It may take place a few weeks, or two or three months, after an attack of insanity. The precise time, Dr. Burrows remarks, when a cure may be said to be complete, is assigned with difficulty. Many experience, for weeks, even months, after recovery, uneasy sensations or confusion in the head; and, as long as these are complained of, no confidence can be placed in the stability of the cure. But when these sensations entirely cease, and all the functions are restored, any subsequent access of insanity is, as in other maladies, a *recurrence* of it, and no relapse.

204. Men are said to be less subject to relapses than women; but this is not the case, for numerous circumstances influence the chance of this event taking place, and to most of those men are more exposed than women. As soon as convalescence commences, the care of the physician and attendants is especially required; for, if imprudent measures be adopted before this period has been succeeded by restored health, a relapse will probably be thereby occasioned. The middle and poorer classes are more apt to relapse than the rich; for the former go from an asylum direct to their misery, and to encounter the exciting causes — probably the same causes which produced their derangement; whilst the latter may enjoy intermediate measures of precaution. Most of the relapses, as well as recurrences, of the disease, proceed from a premature or incautious gratification of habits and indulgences concerned in the production of the primary attack, or from too great mental exertion for the weakened state of the faculties, or from mental excitements or contrarieties.

205. *b*. The probability of a relapse is generally in a ratio with the suddenness of recovery, and is most frequent in mania. Recurrences are most common in melancholia; and, as well as relapses, are very apt to occur, when the mind is influenced by religious fears. Relapses or recurrences are announced by nearly the same symptoms as preceded the first seizure; and when warning has been taken by these, and medical aid procured, a return of the malady is frequently prevented. Indeed, it should always be remembered, that, when the mind has been once disordered, a predisposition is thereby created to a return of the malady when subjected to any of the exciting causes. In some constitutions, this predisposition or aptitude to a renewal of the complaint is much stronger, than in others; and to its greater strength in some persons, is partly to be attributed the remittent or intermittent character it frequently assumes; and the periodicity which it often observes, and which is probably owing to an increase of the predisposition by various physical influences recurring at stated periods. Each successive attack increases the morbid tendency to a return of the malady, and shortens the interval between it and that which is to follow; until, at length, the

intervals not only become much shorter, but also more imperfect; and the disorder at last assumes a remittent, or a permanent form.

206. *c.* The *proportion of cases* in which insanity is recurrent, has been generally overrated, in the opinion of Dr. PRICHARD. Of 444 recoveries, M. PINEL reckoned 71 cases of relapse and recurrence: but, of these 71 cases, 20 patients had experienced several attacks; 16 had left the hospital too soon; 10 came afterwards under treatment, and recovered without relapse; 14 had given themselves up to grief and intemperance; and several others were unfavourably circumstanced. M. ESQUIROL reports 292 recurrences of insanity out of 2804 recoveries, or a little more than one tenth. M. DESPORTES states, that 52 recurrent cases were recognised at the Bicêtre, in 1821, out of 311 admissions; or 17 in 100: and that 66 were received at the Salpêtrière, out of 454 admissions; or 15 in 100. M. GEORGET, however, remarks, that there were, amongst these cases of relapse and recurrence, many who had been discharged in a state of incomplete recovery, as well as a number of drunkards who came every year to spend some weeks in these hospitals, having been taken there in a state of intoxication.

207. Mr. HITCH has furnished Dr. PRICHARD with the particulars of 68 re-admissions, from among 546 admissions. These 68 re-admissions occurred in 25 persons only; and of these, there were 17 men, 10 of whom were paupers, re-admitted forty-nine times; and 8 women, of whom 4 were paupers, who were received nineteen times. Many of those who were re-admitted, had been either removed uncured by the wishes of friends, or discharged "relieved on trial," their friends having found it necessary to replace them: some returned after an apparently perfect cure. The general inference at which Dr. PRICHARD has arrived, is manifestly correct, that the improbability of a recurrence of insanity increases with the length of time which has elapsed without any sign of renewed disease; and that it is also greater in proportion to the completeness of the recovery. When the energy of the mental faculties is fully restored, relapse and recurrence are much less to be feared than when they remain weak and excitable.

208. iii. OF THE FATAL TERMINATION OF INSANITY. — Although the state of the brain connected with insanity may be incompatible with the due exercise of the mental manifestations, yet it may not so disturb the physical functions, as very materially to shorten or endanger life. This is shown both by the duration of insanity in many cases, and by the longevity of lunatics. Instances are adduced by M. DESPORTES and others, of the long continuance of this malady. Among the lunatics at Bicêtre, in 1822, 1 had been there fifty-six years; 3, upwards of forty years; 21, more than thirty years; 50, upwards of twenty years; 157, more than ten years. Among those in the Salpêtrière, there were 7 cases upwards of fifty years; 11, from fifty to sixty; and 17, from forty to fifty. Although many live thus long in a state of insanity, yet the mean duration of existence is shortened by it, and chiefly owing to the following causes, each of which requires a brief consideration:— 1. By exhaustion of organic, nervous, or vital energy; — 2. By the progress of the morbid state of the brain, associated with the mental disorder, so as seriously to disturb the physical functions; — 3. By favouring the development of diseases of several vital organs; — and, 4, By the occurrence of accidental disorders which may be masked by the mental disease, or concealed by it, until it assumes a serious form. The mental disorder, however, is often *symptomatic*, or sympathetic — a consequence of disease more or less latent, of some important abdominal or thoracic viscus, yet seriously affecting the constitution and nervous power; the physical malady being sometimes aggravated, and occasionally suspended for a time, by the sympathetic mental affection, but, nevertheless, terminating life sooner or later. This topic will be more particularly noticed hereafter.

209. *a. Exhaustion and depression of nervous or vital energy may proceed so far as to fatally terminate the insane state.* —This occurs chiefly in mania, wherein the inordinate excitement of the feelings, the constant agitation of both mind and body, the febrile disturbance of the system, and the continued want of rest and sleep, combine to exhaust the powers of life, and to occasion nervous depression and emaciation. In the majority of cases, the exhaustion either takes place gradually, or does not proceed so far as to endanger life; and the maniacal state passes either into recovery, or into dementia: sometimes, however, it is so extreme, or so complete, that the patient never afterwards rallies, but rapidly sinks to death. This occurs most frequently during the first two years from the commencement of the malady; and hence the greater number of deaths from mania, at this, than at any subsequent period. That this result should often follow, in cases where the excitement and general perturbation are great relatively to the amount of vital power, may be assumed *à priori*; and it is in these cases especially, that we find the organic lesions insufficient to account either for the mental disorder, or for the fatal termination. In extreme cases of melancholia, death may take place from depression, or sinking of nervous and cerebral power; and this state may be aggravated even to a fatal issue by a too depressing or exhausting method of cure, or from want of those means of restoration required by the peculiarities or exigencies of the case.

210. *b. The morbid state of the brain associated with the mental disorder may proceed so far as to seriously, and at last fatally, disturb the physical functions.* — In these cases, the lesions of the brain may vary remarkably in respect of seat, extent, and nature of parts implicated in them; and may commence gradually, and proceed slowly to fatal disorganisation, or may take place more or less suddenly, and terminate rapidly. In either case, we can observe only the ultimate and gross results in our examinations of the brain and its appendages after death; but there can be no doubt that these, during their development and increase, give rise to phenomena, several of which have been described when treating of the principal *complications* of insanity (§ 167. *et seq.*), — especially to the different forms of paralysis, to epilepsy and convulsions, to apoplexy, and to coma, either of which may terminate life.

211. *c. The development of serious diseases of vital organs seated in either the thoracic or the abdominal cavity, and even of the system generally, seems to be favoured by insanity*; and it is to these

diseases that a fatal termination is often owing. Many consider the occurrence of these diseases accidental; but they are so frequently observed among the insane, relatively to other classes of persons, that something more than chance is concerned in their production. As I believe that insanity — and particularly certain forms of it — is more or less connected with general debility of the organic nervous system, expressed more especially in the brain; so I consider that the functions, and subsequently the structure, of other important organs will suffer during the continuance of it, — particularly if any predisposition to disorder in these organs have already existed. And, accordingly, we find that those viscera most obnoxious to disease, especially in weakened states of vital energy, are the most frequently attacked. — *α*. Most writers and observing practitioners have remarked the great number of instances in which the death of insane persons was owing to *tubercular consumption* and inflammations of the pleura. In these cases, the pulmonary disease has generally proceeded in an insidious or latent form, until shortly before the fatal event has taken place. In many, insanity may be viewed as inducing a disposition to disease of the lungs, and as favouring the operation of its exciting causes, which may be more than usually influential and frequent in their operation during mental disorder. Dr. Greding found that 40 out of 100 maniacs, and 20 out of 25 melancholics, laboured under phthisis; and that 74 of 100 maniacs, and 20 out of 24 melancholics, were found to have more or less effusion, either in one or both cavities of the thorax. This may be an extreme frequency of these complications, or be owing to local or peculiar causes; but there can be no doubt of their frequency. Insane persons affected by these diseases of the lungs, lose their strength, suffer slow or hectic fever, become emaciated, and at last have cough and shortness of breathing, with diarrhœa. In this state the insane symptoms rather increase than abate, and generally continue until death. In some cases, the pulmonary disorder precedes the mental disorder, or accompanies it. This is especially the case with melancholia, as remarked by M. Esquirol, and with hypochondriacal monomania. In these, the impairment of vital power affects both the lungs and the functions of the brain, and sometimes both nearly simultaneously.

212. *β*. *Diseases of the heart* and great vessels are also often concerned in hastening a fatal issue of insanity. M. Foville states, that five out of six bodies display, upon examination after death, some organic disease of the heart and great vessels, — particularly hypertrophy of the heart. This is most probably owing, in part, as he supposes, to the violent efforts and agitation of insane patients.

213. *γ*. Although *diseases of the digestive organs* frequently exist previously to the appearance of insanity, and are often more or less concerned in causing it, yet they often do not become objects of attention until after it has fully declared itself; when, from their nature or severity, they obtrude themselves upon the notice. Whether the disorder consist of gastro-intestinal irritation or not, at the commencement, it frequently passes into it; and, at last, terminates in ulceration, originating chiefly in the mucous follicles, or in abrasion of portions of the mucous membrane. At the beginning of the mental disorder, and particularly of melancholia and mania, constipation is both obstinate and of long continuance; the most drastic or active medicines being required to act upon the bowels. But it generally at last gives way, and is followed by, or alternates with, diarrhœa, which sometimes passes into dysentery, and which rapidly exhausts the strength of the patient, without abating the mental disorder.

214. *δ*. The *cachexia* already noticed, frequently associates itself with other maladies, in causing a fatal termination of insanity, and particularly with disease of the alimentary canal, and enlargement, obstruction, torpor, and congestion of the *liver*, and even also of the *spleen*. In many cases, this state of cachexia is evinced by a sallow, lurid, dirty, and scaly state of the skin; and by papular eruptions or discoloured patches. It sometimes proceeds to more obvious disease of the fluids and soft solids; furunculi and carbuncles break out in different parts of the body, and sometimes slough extensively; the gums become spongy and sore, and bleed upon the slightest irritation; livid blotches occasionally appear on the lower extremities; and complete scurvy at last supervenes. In other cases, emaciation, occasionally amounting to marasmus, a cold and clammy state of the general surface, diarrhœa, and colicky pains in the abdomen, take place, either with or without the more obvious indications of scurvy; and the patient sinks from the gradual decay of vital power, and the effects of this decay upon the digestive, the assimilative, and nutritive functions. These cases are most frequently met with in dementia and chronic mania, — the mental faculties indicating a failure of the vital manifestations of the brain, altogether similar to that of the other important organs of the body.

215. *d. There are other maladies of more accidental occurrence, which often terminate the life of the lunatic.* — These, as well as the most of those just noticed, may be masked by the mental disease, or entirely concealed by it, until they reach a serious or even dangerous form, or they may not be detected until disclosed by a *post mortem* examination. The complaints of the patient even are often overlooked and taken for delusions. This is especially the case in hypochondriacal monomania, and melancholia. But the truly observing physician will frequently recognise, in the delusions of the insane, bodily disease of a serious nature. Several of the delusions already noticed, have been shown to depend upon contingent organic lesion of a vital or important organ. Sufficient proofs of the truth of this have been adduced above (§ 21.); and I need not further allude to this topic, than to press the importance of this connection, and the necessity for carefully ascertaining what connection may exist between the illusion entertained and visceral lesion. Many of the diseases which may be viewed as accidental only as respects their occurrence in lunatics, may, in some degree, be owing to the physical state of these individuals; inasmuch as they are more frequently attacked by these diseases, and suffer more severely from them than any other class of persons. — Fevers and chronic inflammations are often met with among them; the former generally assuming a typhoid character with predominant cerebral affection, and frequently terminating fatally; the latter often giving rise to effusion, and causing death in consequence.

216. *e.* The *diagnosis of visceral diseases in lunatics* is remarkably difficult, owing either to the unfounded complaints made by them under the influence of fancied and erroneous sensations, or to the extent to which the mental disorder masks the physical disturbance. Many lunatics labour under severe diseases, without evincing them by any expression — because either these diseases do not occasion much suffering, or the disturbed state of their minds prevents the morbid sensation from being perceived. In this latter respect, the diseases of lunatics are more obscure than those of infants, because the latter express their ailments by their cries and attitudes. M. GEORGET justly remarks, that, where we observe a lunatic, who had previously been agitated and furious, become morose and taciturn, and at the same time lose his appetite, seek repose, and display a suffering and dejected expression, we ought to examine him carefully, for he is attacked with acute disease. The development of symptoms will soon point out the seat and nature of the malady. But chronic affections are so slow in their approach, and so latent in respect of their symptoms, that they often reach a very advanced stage before their existence is suspected, unless a careful examination had been made before, as well as after, their commencement. This is especially the case in regard of diseases of the lungs, heart, pleura, and of the organs of digestion. From this it is manifest that insane persons should be carefully watched and examined, and that the states of the lungs and heart should be investigated from time to time by percussion and auscultation.

217. *f.* The *rates of mortality* among lunatics have received much attention from M. ESQUIROL and Mr. FARR; the former of whom states, that the highest rate, for the two sexes, is between the ages of 40 and 50: that of women is greatest between 50 and 60; that of men between 40 and 50. A greater number of men than women die insane; and this is partly owing to the greater frequency of the more dangerous complications in the former than in the latter. M. ESQUIROL concludes, from a comparison of different hospitals, the deaths to be — in *mania*, 1 in 25; in *monomania*, 1 in 16; in *melancholia*, 1 in 12; and in *dementia*, 1 in 3. He further states, that a greater number of deaths take place in December, January, and February, than in any other three months. Mr. FARR states, that the mortality furnished by Bethlem, St. Luke's, and the Asylums at Stafford, York, Lincoln, Gloucester, and Hanwell, amounted to 10·40 out of 100 treated; that the annual mortality among lunatics was 9 per cent.; and that the mean ages of those admitted at Bethlem varied from 36 to 39. That no precise idea can be formed, however, from these data, of the mortality of the insane, is evident from the fact, that two of the principal of these institutions do not admit any but recent cases, and that they do not allow these cases to remain longer than one year. Enough, notwithstanding, is adduced to prove that *insanity remarkably shortens the mean duration of life.*

218. Considerable difference exists in estimates formed by writers of the numbers of deaths from the prevailing diseases among lunatics. Indeed, no precise data can be furnished on this point; for those who parade numerical data or details in this, as well as in other maladies, by no means satisfy us in what manner those details have been obtained. Numerical results, unless furnished by the ablest and most discriminating observers, and with the utmost accuracy and good faith, may mislead more than instruct: and this is a subject on which it is next to impossible to furnish them with precision. Besides, the comparative prevalence of fatal diseases in lunatics will necessarily vary in different places, with numerous related circumstances and contingencies. The diseases, also, of the insane are often so complicated, that different observers may impute the fatal result to different affections or lesions even in the same cases, although the matter may seem to have been placed beyond dispute by a *post mortem* examination. Thus, tubercular formations in the lungs and extensive ulcerations in the bowels will often be found in the same case; or disease of the liver, lesions in the brain, and inflammation of the peritoneum, or of the pleura, in another; or changes in the heart, effusions into the cavities, and lesions of some other organ, in a third: and hence different physicians may ascribe death to very distinct organic changes. Some, even, satisfied with the alterations presented by one vital organ, may leave other important viscera either entirely unexplored, or insufficiently investigated, although they may be equally, or even more, affected.

219. Notwithstanding these objections, it may be conceded that the most fatal maladies among the insane occur nearly in the following order as to frequency: — More or less sudden deaths from apoplexy, coma, and convulsions; — pulmonary and pleuritic lesions; — nervous, typhoid, adynamic, and putro-adynamic fevers, usually with predominant affection of the brain; — general palsy; — general cachexia, frequently with colliquative diarrhœa; — organic lesions of the liver, bowels, and mesenteric glands, causing marasmus, &c.; — exhaustion of vital power without sufficient alteration of structure to account for death; — structural change of the heart, &c.; and dropsical effusions into shut cavities, particularly the pleural and pericardiac; — mortification, chiefly of parts pressed upon, and of the extremities; — organic changes in the stomach and pylorus; — chronic peritonitis, generally latent; — alterations of the uterus, spleen, and pancreas, &c. Organic lesions of the brain, lungs, heart, and digestive organs are found variously associated, in most cases, upon examination after death; those of one organ predominating over the rest in different cases, and seldom presenting a due relation to the symptoms or disorders complained of, or manifested during life. Diseases in the abdominal organs, and particularly in the intestinal mucous surface, are amongst the most frequent morbid associations of insanity, but generally contingent upon it, and not until an advanced period of its progress; although, as will appear in the sequel, they are also important physical causes of it. M. ESQUIROL observes, that of upwards of 600 examinations after death, three eighths die of diseases of the abdomen, two eighths of diseases of the chest, and three eighths of alterations of the brain and membranes. The proportion here assigned to the first class of diseases is probably too high, and especially in respect of this country. A very able writer remarks, that the reports of lunatic asylums partly show, that the corporeal ailments, under which the patients languish and die, are very often overlooked, and are

consequently not met by proper treatment; and that these establishments are made a kind of show-houses, instead of being hospitals for the complicated diseases which involve the functions of the mind. "We grant," he goes on to state, "that the mental malady may often be but the first sign of that total impairment of the frame which phthisis, or hydrothorax, or scorbutus, or paralysis, or marasmus afterwards more plainly declare; but we suspect there are cases in which, if the life of the patient were preserved through some of the maladies supervening on the mental disorder, the mind would be found to be restored, and the malady to be critical. With the present management of lunatic hospitals, these conjectures can neither be verified nor refuted. In many of them, medical aid is considered to be nearly superfluous; and in some, we are informed that the appointment of physicians in ordinary has been, if not rejected by the governors, at least, subjected to grave debate, as if the County Asylum were no more than a supplementary county jail." (*Brit. and For. Med. Rev.* No. xiii. p. 30.).

220. M. Esquirol gives the following tables of the mortality in insanity, according to the ages:—

	Bicêtre. No. of *Men* admitted from 1784 to 1794, 2405.	Salpêtrière. No. of *Women* admitted from 1804 to 1814, 2804.
20 to 30	25	58
30 to 40	176	83
40 to 50	215	143
50 to 60	134	173
60 to 70	90	123
70 and upwards	45	210
	685	790

Table of the Mortality at the Sâlpetrière during 10 Years.

No. admitted each Year.	1804	1805	1806	1807	1808	1809	1810	1811	1812	1813	Total.
271	46	21	15	8	1	6	2	1	1	1	102
301	—	48	29	16	7	2	4	1	—	2	109
292	—	—	49	22	9	2	1	4	2	1	90
297	—	—	—	64	25	3	2	2	4	1	101
252	—	—	—	—	35	23	8	1	3	1	71
299	—	—	—	—	—	35	31	7	3	1	81
260	—	—	—	—	—	—	30	22	9	3	64
233	—	—	—	—	—	—	—	26	20	9	55
301	—	—	—	—	—	—	—	—	23	10	33
298	—	—	—	—	—	—	—	—	—	26	26
2804											738
Deaths during this period amongst those admitted before 1804											52
											790

Of 790 deaths at the Salpêtrière, from 1804 to 1814, 382 occurred in the first year after admission, 227 in the second, and 181 in the seven following years.

221. The table of deaths from insanity, and from the diseases of the brain most nearly allied to insanity (p. 475.), is made up from the "*Abstracts of the Causes of Deaths registered in England and Wales, from 1st of July to 31st of December*, 1837, *both inclusive*." These abstracts, and the remarks accompanying them, by Mr. Farr, are extremely valuable to medical men. It is to be hoped, that the reports of the register general will appear annually. Mr. Farr states, that the insane, who die in lunatic asylums, have often been registered improperly under secondary diseases, such as apoplexy and diarrhœa. Under the head of violent deaths are included suicides, accidents, &c.; and it cannot be doubted, that the great majority, at least, if not the whole, of suicides, are instances of some form or grade or other of insanity.

222. V. Of the Alterations of Structure connected with Insanity. — It is evident, even from what I have already stated, that few diseases are connected with so great a diversity of structural changes as insanity; and there is none which has given rise to so much discussion and difference of opinion as to the nature of this connection, as it has occasioned. It has even attached to itself a very particular interest at present, owing partly to its importance, and partly to the very opposite views entertained respecting it by some of the most experienced of recent writers on mental diseases. — But little information was furnished on this subject previously to the almost contemporaneous publication of some cases, with the *post mortem* appearances, by Morgagni and Meckel. — Ballonius, and long afterwards Bonet, had furnished a few particulars; but these were rather of lesions found in the thorax and abdomen, than of changes within the head; and it was not until the investigations of Greding, Marshall, and Haslam appeared, that the appearances of the brain in fatal cases of insanity received any degree of attention. More recently, the researches of Pinel, Esquirol, Georget, Bayle, Lallemand, Bouillaud, Neumann, Guislain, Calmeil, and Foville, have been most assiduously directed to this interesting subject; still the results furnished by them are of such a kind as to prove the necessity for further investigation, carried on independently of preconceived opinions. Although British writers have hitherto contributed but little to this department of medical knowledge, it is to be hoped that those who have the management of public institutions for insanity in their hands, will see the advantages which will result contingently even to those connected with themselves, — will catch a glance of their own interests prospectively, — from the encouragement of researches into the pathology and treatment of the most distressing of all maladies, not merely for the benefit of the few subjects of the maladies to whom they are guardians for a time, but also for the instruction of those to whom the community have to look for aid in these calamities, and, consequently, for the advantage of all classes in society.

223. i. Morbid Appearances observed in the Head. — *A.* The *cranium* seldom presents any change from the healthy *shape*, excepting in epileptic or idiotic lunatics. Greding states, that of 220, only 16 had the forehead contracted, the temples compressed, and the occiput large and expanded. In a few, the head was elongated and compressed laterally. In some, the head was almost round, or of a square shape: these were chiefly epileptic lunatics and idiots. I have observed, in this class, one side of the head higher than the other, and sometimes also more prominent, whilst the other side receded, giving rise to the *diamond-formed obliquity* or deformity of the skull described by me in the article Cranium (§ 9.). Of 26 cases, including epileptic lunatics and idiots, Greding observed 2 belonging to these latter, with very small and quite circular heads. Of the whole number of cases (220), the skull was unusually thick in 167: this was

Table of Deaths from Insanity, and from Diseases most nearly allied to it, in England and Wales, *from* 1st *of July to* 31*st of December*, 1837, *inclusive.*

Names of Places.	Area, in Acres.	Population according to the Census of 1831.	Insanity.			Delirium Tremens.			Cephalitis.			Paralysis.			Apoplexy.			Epilepsy.			Disease of the Brain.		
			Males.	Females.	Total.	Males.	Females.	Total.	Males.	Females.	Total.	Males.	Females.	Total.	Males.	Females.	Total.	Males.	Females.	Total.	Males.	Females.	Total.
The Metropolis, and parts of Middlesex, Surrey, and Kent - - - - - - - -	44,810	1,594,890	38	39	77	30	4	34	159	135	294	161	176	337	259	230	489	64	43	107	91	71	162
Manchester and Salford - - - - -	37,797	236,935	1	1	2	0	0	0	9	14	23	23	17	40	25	6	31	3	4	7	10	8	18
Liverpool and West Derby - - - -	38,060	218,233	8	1	9	0	0	0	7	6	13	22	13	35	34	17	51	6	7	13	2	5	7
Leeds - - - - - - - - -	41,520	135,581	1	0	1	1	0	1	11	9	20	1	7	8	13	10	23	0	1	1	16	9	25
Birmingham - - - - - - - -	2,660	110,914	5	5	10	1	0	1	5	3	8	8	13	21	14	11	25	4	2	6	5	5	10
Part of Middlesex, Hertfordshire, Buckinghamshire, and Bedfordshire - - - - - -	1,323,888	515,893	9	4	13	4	1	5	21	18	39	28	27	55	60	61	121	11	19	30	8	17	25
Kent, part of Surrey, Sussex, Hampshire, and Berkshire - - - - - - - -	3,861,100	1,351,236	16	14	30	9	0	9	53	37	90	95	107	202	188	168	356	30	32	62	66	35	101
Dorsetshire and Wiltshire - - - - - -	1,407,913	373,797	3	3	6	2	0	2	10	6	16	42	44	86	33	37	70	9	12	21	5	3	8
Devonshire - - - - - - - -	1,691,572	503,118	3	2	5	4	0	4	21	11	32	39	32	71	61	64	125	12	8	20	14	12	26
Cornwall - - - - - - - - -	866,474	304,785	1	1	2	0	0	0	8	5	13	18	30	48	25	30	55	1	6	7	4	4	8
Somersetshire - - - - - - - -	987,087	451,252	5	2	7	3	0	3	17	14	31	22	27	49	42	29	71	8	6	14	17	11	28
Essex - - - - - - - - -	928,589	304,315	0	6	6	2	0	2	12	9	21	18	17	35	32	35	67	8	11	19	8	5	13
Norfolk and Suffolk - - - - - - -	2,118,867	682,788	7	15	22	2	0	2	21	15	36	39	63	102	58	59	117	11	9	20	11	14	25
Cambridgeshire, Huntingdonshire, and South Lincolnshire - - - - - - - -	1,295,379	311,714	0	0	0	2	0	2	7	8	15	22	13	35	24	22	46	4	9	13	5	7	12
North Lincolnshire, Rutlandshire, Derbyshire, Nottinghamshire, Leicestershire, and Northamptonshire	3,936,980	1,045,133	5	7	12	5	0	5	18	27	45	65	78	143	96	72	168	20	21	41	33	26	59
Oxfordshire, Gloucestershire, Worcestershire (except Dudley), and Warwickshire (except Birmingham) -	2,355,462	977,108	13	8	21	4	0	4	41	33	74	63	83	146	104	87	191	12	21	33	50	32	82
Mining parts of Shropshire, Worcestershire, and Staffordshire - - - - - - - -	140,798	223,457	2	1	3	0	0	0	9	7	16	9	11	20	11	21	32	3	2	5	5	4	9
Cheshire, Shropshire, and Staffordshire (except mining districts) - - - - - - -	2,216,515	721,555	8	12	20	3	3	6	26	11	37	45	51	96	64	60	124	13	19	32	14	14	28
Lancashire (except Liverpool and Manchester), south of Morecambe Bay - - - - - -	1,131,270	905,501	9	6	15	1	0	1	36	22	58	58	50	108	69	44	113	15	14	29	10	6	16
West Riding of Yorkshire (except the northern part thereof, and Leeds) - - - - - -	1,250,530	773,254	4	4	8	4	0	4	26	27	53	33	21	54	40	42	82	12	9	21	18	10	28
City of York, and East Riding of Yorkshire - -	730,945	199,515	0	2	2	2	0	2	8	4	12	10	13	23	34	28	62	9	12	21	5	3	8
Durham, and the North Riding of Yorkshire, with the remainder of the West Riding (except the mining part) - - - - - - - -	2,104,736	319,042	1	2	3	4	0	4	12	8	20	23	31	54	41	36	77	7	4	11	9	10	19
The mining parts of Northumberland and Durham -	88,708	318,941	1	2	3	0	0	0	20	12	32	57	34	91	40	30	70	0	1	1	10	5	15
Cumberland and Westmoreland, with the remainder of Lancaster and Northumberland - - -	1,590,448	338,273	1	0	1	0	0	0	13	7	20	33	22	55	21	26	47	3	4	7	8	7	15
Wales, Monmouthshire, and Herefordshire - -	- - - -	1,016,219	6	1	7	3	1	4	7	6	13	73	72	145	60	39	99	13	16	29	14	3	17
England and Wales - - - - - -	Area in Sq. Miles. 57,805	13,897,187	147	138	285	86	9	95	567	454	1021	987	1052	2039	1447	1264	2711	278	292	570	438	326	764

observed in 78 out of 100 cases of mania, and in 22 out of 30 idiots. In some cases, the cranium was remarkably thin. Numerous foramina were observed in the inner table of 115 out of 216 cases; and, in some instances, bony projections arose from this table. Similar changes in the cranial bones were noticed by Neumann and Georget, — the latter of whom has inferred hypertrophy of these bones to be still more frequent in lunatics than stated by Greding. The bones of the head have likewise been observed more vascular than natural by Calmeil and others. (See art. Cranium, § 9—12.)

224. *B.* The *membranes of the brain* are frequently altered. — *a.* Greding found the *dura mater* adherent to the cranium in 107 out of 216 cases; in a few instances, of a bluish black colour, thickened, and containing ossific deposits. Similar lesions were observed by M. Georget, who also detected the *arachnoid* sometimes thickened, but smooth, and occasionally presenting, in places, additional lamina of a red or grey colour. The *pia mater* was, according to this pathologist, injected, thickened, and infiltrated with serum, giving it at first the appearance of a gelatinous deposit. Greding found it thickened and opaque in 86 out of 100 cases of mania, and beset with small spongy bodies in 92 out of 100; these bodies being united to the surface of the brain, and in some instances containing ossific matter. M. Calmeil has described these excrescences, granulations, or spongy bodies, to arise or grow from the pia mater so as sometimes to penetrate the dura mater and cause absorption of the inner bony surface of the cranium: and he has remarked, that infiltrations and thickenings of parts are almost constantly found under these excrescences. The above changes in the membranes, and particularly in the arachnoid, have been recorded also by Haslam, by Guislain, and by M. Bayle. To these alterations, and to effusion of serum between the membranes and in the ventricles, this latter physician ascribes the chief phenomena characterising and contingent upon insanity.

225. *b. Effusions of serum* between the dura and pia mater were observed by Greding in 120 out of 216 cases of insanity, and in 58 out of 100 maniacs; and between the pia mater and surface of the brain, in 28 out of 100 cases of mania. The lateral ventricles were full of serum in 29 instances, and remarkably distended in 23. They were equally distended in 10 amongst 24 cases of melancholia. The third ventricle was quite full in 57 out of 100 maniacs, and in 16 out of 24 melancholics. The fourth ventricle was distended to the utmost in 80 out of 100 maniacs, and quite empty only in 3. It was greatly distended in every one of 24 melancholics examined. Dr. Haslam found serum effused between the membranes in 16, and in the lateral ventricles in 18, out of 37 cases. Effusions between the membranes and in the ventricles were met with also by MM. Georget, Guislain, and Bayle, — the last of whom ascribes insanity to inflammatory irritation of the membranes; effusion following upon the inflammation, in his opinion, and occasioning the cessation or diminution of maniacal violence, the great loss of power in the intellectual faculties, and the commencement of general paralysis, owing to the pressure caused by the effusion. According to this view, the progress of dementia, fatuity, and general paralysis indicates a corresponding increase of effusion and of pressure on the brain. Other writers, who differ from M. Bayle as to the origin and seat of insanity and general paralysis in chronic inflammation of the membranes, and of serous effusion from them, readily admit the great frequency of these lesions. Lallemand, Calmeil, Bouillaud, Casauvieilh, and Foville have all described similar changes to the above; but have viewed them more in connection with alterations in other parts, and estimated them differently.

226. *c.* The *choroid plexus* was found in a healthy state by Greding in 16 cases only out of 216, and thickened and full of hydatids in 96 out of 100 maniacs. M. Georget has remarked that the choroid plexus was exsanguineous, and contained hydatidiform vesicles.—The *lateral ventricles* were in some instances very small; but, much more frequently, large, and distended, as just stated, with serum, which was remarkably clear and limpid. — The *convolutions* of the brain were often observed, by M. Georget, separated by an effusion of serum, and the pia mater thickened.

227. *d.* M. Foville states, that, in acute cases, the morbid appearances discovered in the meninges were chiefly injection of the pia mater; and that this injection was generally proportioned to the degree of inflammation existing in the cortical substance of the convolutions. The small arteries and veins passing from the membrane and penetrating the grey matter were distended with blood: the arachnoid, in these cases, generally retains its natural aspect. The chronic changes in the membranes, according to this observer, consist for the most part in opacity, increased consistence, thickness of the arachnoid, the formation of granulations and false membranes on its surface, and the effusion of serum into the cellular tissue of the pia mater and into the ventricles. The arachnoid is often, in patches or more extensively, of a pearly whiteness. The opacity of this membrane is always attended by thickening; and in the place where the arachnoid and pia mater are naturally contiguous, they are found to be adherent. The opaque patches result from the deposition of albumen upon the arachnoid.

228. *C.* The *substance of the brain* has been more closely examined in cases of insanity, in recent times, than heretofore. Indeed, the progress that has lately been made in the minute anatomy of this organ, will necessarily enable the pathologist to recognise many lesions of its structure, which were entirely overlooked in former times. The researches of M. Foville into the state of the brain in persons who have died insane, are of great importance, and were carried on by him in the Sâlpetrière, aided by MM. Delaye and Pinel Grandchamp, and subsequently in the extensive hospital of St. Yon, near Rouen, which is under his care. The morbid appearances which I proceed to describe, as having been observed in the brain, are chiefly the results of his investigations.

229. *a.* The *grey substance of the brain* presents, in the most acute cases, on the removal of the membranes, intense redness of its surface, approaching to that of erysipelas. This is still more marked in the substance of the cineritious tissue itself; and it is more striking in the frontal region, than in the temporal and lateral lobes,—and in the higher regions, than in the posterior parts. — In *acute cases* of insanity, M. Foville states that

dura mater, separation of its fibres; effusion of serum into the cavity of the arachnoid; false membranes, organised or without organisation; cysts filled with blood in its two laminæ; simple hæmorrhages in the arachnoid; œdema of the meninges; injections and thickenings of the membranes; vegetations of the pia mater, and development of its vessels; adhesions between the pia mater and the convolutions; disappearance of the grey substance; softening, induration, and discolouration of this substance; hardening and injection of the white or fibrous structure; redness and tumefaction of the ventricular villosities; serous effusion into the ventricles; apoplectic cysts; erosions of the convolutions; softening of the brain, or of the spinal marrow. These changes are so various, and so far from uniform in occurrence, that they cannot satisfactorily explain the results imputed to them. M. Calmeil considers them all to be proofs of a chronic inflammation of the brain; and in this, as well as in his descriptions of many of the alterations, he agrees with M. Foville. This latter writer states that, in lunatics affected with general paralysis, he found the induration of the fibrous structure of the hemispheresd escribed above (§ 232.), wanting only in two cases, and in these the cerebral nerves, the annular protuberance, and the medulla oblongata presented extreme hardness. He states further, that this induration of the fibrous structure of the brain has been found in old men, whose voluntary movements have become uncertain or vacillating; but it has never been seen in lunatics whose muscular powers had remained unimpaired. I have observed induration of the spinal cord, with effusion of serum between the membranes, and other changes, in two cases of general incomplete paralysis unattended by insanity; both patients, however, having become delirious shortly before death.

236. The brain has occasionally been so infiltrated with serum, that the fluid has flowed from the surface of the incisions. This infiltration has been so remarkable in a few instances, as to constitute a true œdema of the brain. Much more rarely, as observed both by Esquirol and by myself, a multitude of pores or small cavities, containing a limpid serum, have been found in the substance of the brain; a section of the part thus changed resembling that of a porous cheese. In these cases, the brain may be also somewhat indurated and changed in colour. It is by no means determined, as some suppose, that these pores or cavities are the sequelæ of vascular extravasations. It is more probable that they are the consequences of softening; the pores being left by the removal of the molecules of the cerebral substance, which have lost their vital cohesion to the rest of the structure, and filled by a serous effusion.

237. *f.* The *inferences which may be drawn from these researches* deserve a brief notice. It will be seen from these, that M. Foville ascribes the morbid appearances to inflammation; and, in this, agrees with Calmeil and others. But it will be remarked by many, and not the less by those who may have read the article Inflammation in this work, that this term has been applied, and possibly is applicable, to several lesions, attended by changes in the state of capillary and vascular action, each differing more or less from the other, and accompanied with different, or even opposite, conditions of organic nervous or vital power; and that, although these lesions may be apparently quite similar, and be followed by nearly the same results, in different cases or persons, yet may the state of vital power or manifestation, in respect not only of the functions of the brain, but also of the whole economy, differ remarkably in each particular instance. It is well known that the lesions constituting, as well as consequent upon, several kinds of phlegmasiæ — upon phlogosis, or simple sthenic inflammation, and upon erysipelas and other forms of spreading or asthenic phlegmasia — nearly resemble each other; but they are attended by very different constitutional disorder; and this is independently of grades of activity or intensity of action. Besides, something should be attributed, in many cases, to the influence of the moral causes, and to the consequent mental excitement, upon the cerebral circulation, with reference not only to prolonged erethism or excitement of the capillaries distributed to the organ of mind, but also to constitutional or vital power, and to the various maladies of which the cerebral affection may be only a symptom, or sympathetic disorder. We know that, in other organs or parts, a prolonged irritation or excitement of their capillaries, by agents which excite chiefly the nerves supplying them, will so determine the blood to them, and so enlarge and develop their vessels, as to give rise to appearances which nearly resemble the consequences of inflammation. We find, moreover, that the most violent forms of mania and of delirium, and the most fatal when not judiciously treated, are actually those in which inflammatory appearances are the least evinced, or in which states opposite to inflammatory really exist. We find, also, lesions in the brain — whether inflammatory or not — equally extensive with those observed in the most general and complicated cases of insanity, and without any disorder of mind having existed during life. Can we, therefore, legitimately impute insanity, in all cases, to these lesions? or may not these lesions be just as legitimately imputed to the insanity? There is very probably a connection between them, in most cases; but neither the exact nature of the connection, nor the intimate relations and source of the morbid alterations observed, have been yet fully ascertained. This is, however, no reason wherefore we should altogether reject the conclusions at which able and experienced observers have arrived, until we obtain others upon which more implicit reliance can be placed.

238. The morbid changes in the encephalon, M. Foville infers to be the results of inflammation: intense, diffused, and general redness; in many cases, tumefaction; and, in passing to the chronic state, the formation of adhesions between the cortical substance of the convolutions and the contiguous membrane: besides this, adhesion of the different planes, or layers of the cerebral substance, to each other, in a certain number of cases. As the different traces of inflammation are more constant in the brain than in the membranes, M. Foville concludes that the essential change connected with insanity takes place in the brain, and that alterations of the membranes are only accidentally connected with it. Amongst the morbid appearances in the brain, lesions of the grey structure are considered by him as the most constant in connection with the mental disorder. Although M. Calmeil was inclined to ascribe loss of mus-

cular power to disease of this structure, M. Foville contends that the facts upon which he founds this inference do not warrant this conclusion. In all the cases of general paralysis he has examined, there was, besides the change in the grey structure, some alteration, either hardening, serous infiltration, or softening, of the white or fibrous substance; and in most cases, in addition to these, there were adhesions of the principal planes of the cerebral substance to each other.

239. From the circumstance of the grey substance of the hemispheres being found in a state of disorganisation or atrophy, in cases where intellect was abolished, and the fibrous structure being natural where muscular power was unaffected, as well as from the fact of lesions or wasting of this latter structure being observed where voluntary motion was lost or affected, M. Foville infers, that the function of the grey structure of the brain is essentially connected with the intellectual operations, and that the office of the white or fibrous part is subservient to muscular action; and consequently, that — 1st, morbid changes in the former part are directly connected with intellectual derangement; and, 2dly, those in the latter portion are connected with disorders of the motive powers. He, however, admits, that in some affections of the maniacal class succeeding the action of debilitating causes, — as in the puerperal state, — nothing has been discovered in the brain more striking than its extreme and general paleness; and that, although some mottled appearances of a light red or rose colour are met with, these changes are too slight to be considered as idiopathic. M. Foville is therefore induced to consider this form of mental disorder to be symptomatic of some deep-seated disease of the uterus or abdomen. But, unfortunately for his argument, of several cases of puerperal mania which I have treated, I have not met with one that did present any serious or deep-seated disease in these parts. There can be little doubt, however, that the contradictory evidence given by different observers of the appearances of the brain in cases of insanity, is partly accounted for, as remarked by an able writer, by the existence of cases in which the affection of the brain is merely functional and sympathetic, — the primary disease being in some other organ, especially in some of the abdominal viscera.

240. The evidence of those who believe that insanity, although often connected with organic lesions of the brain, especially in protracted and extreme cases, does not necessarily depend upon them, requires some notice. Here the experience of M. Esquirol attaches to itself great importance. He remarks, that the bodies of lunatics offer numerous varieties as to the situation, number, and kind of morbid appearances, and that the lesions of the encephalon are neither in relation to the disorders of the mind, nor to the maladies complicated with it. Some lunatics, whose mental and bodily disease indicated extensive organic lesions, have presented slight changes in the brain; while others, whose symptoms had been less severe, have been subjects of great and numerous alterations. But even in the most protracted cases of insanity, no organic changes whatever have been traced, either in the brain, or in its membranes. He goes on to state, "that pathological anatomy is yet silent as to the seat of madness, and that it has not yet been demonstrated what is the precise alteration in the encephalon which gives rise to this disease." The various states of the brain, compatible with integrity of the mental faculties, have never been satisfactorily investigated, and probably will never be accurately ascertained; and it is by no means easy to distinguish, with sufficient precision, the appearances resulting from, or belonging to, concomitant maladies, from those which belong to the mental affection. M. Esquirol observes, that organic lesions of the brain are declared by symptoms distinct from the mental disorder; that chronic inflammation produces compression and paralysis, and paralysis results from cerebral hæmorrhage; and that tubercles, tumours, and softening of the brain have their peculiar symptoms, which cannot be confounded with mental alienation. Moreover, the sudden and instantaneous relief experienced, in some cases of madness, is not to be forgotten; nor the fact, that every part of the brain has been found altered, suppurated, destroyed, without chronic lesion of the understanding.

241. The maniacal form of insanity is rarely fatal, owing to any lesion of the brain; but from fever, phthisis, and other associated maladies, or from sudden exhaustion of the sensibility or nervous power necessary to life. In a case which terminated in this latter manner, no lesion was observed in the brain after death; and in a young woman, accidentally killed in recent and furious mania, the brain and its membranes were likewise devoid of change. When a case is watched during life, M. Esquirol thinks that the period at which the organic lesion of the brain commences, may be known by the symptoms. When mania has existed long, he is of opinion that the weakness of the last days of life disposes to local inflammations. Upon the whole, he concludes, that, notwithstanding the labours of MM. Foville, Calmeil, Bayle, and Guislain, the organic reason of mental derangement is still undeclared. "Thirty years ago," he adds, "I should have written willingly on the pathological cause of insanity: I will not now attempt so difficult a labour, — such are the uncertainty and contradictions in the results of the examination of the bodies of lunatics after death up to this day. But modern researches permit us to hope for more positive, clear, and satisfactory notions." In another place, he admits, that a difference in the results of researches may arise from the greater care with which the brain is now dissected, and the slightest changes observed; and that, at earlier periods of the investigation into the pathological anatomy of insanity, an account was kept only of obvious alterations.

242. Respecting this matter, M. Guislain appears to steer a middle course in his more recent work on Insanity. After various details, he concludes, that, in the greatest number of organic lesions of the brain, a moral origin and functional state of disorder, without alteration of structure, first exists; and that, when such alterations are present, they consist chiefly of whatever causes pressure of the brain, as effusion of serum, or of blood, lymph, or the formation of a false membrane; or of constriction of the organ by its membranes, which, in their state of engorgement, incarcerates, or strangulates, in some respects, the hemispheres; or of softening, or other disorganisation, to an extent that is incompatible with the due exercise of the

mental manifestations. He adds, that *induration* of the brain has been often observed by him, especially in the parietes of the lateral ventricles, and in the rachidian bulb, or upper portion of the medulla oblongata: that epileptic convulsions frequently attend it; that convulsions are often also caused by organic lesions of the membranes, and of the cineritious structure, but not constantly either by these, or by induration; and that they may occur even without any visible change of tissue. He concludes, that absence of organic alterations of the brain is indicated by the full possession of muscular action and motion, and that the existence of them is evinced by lesion of muscular motion and of sensibility — that simple disorder or excitement of the mental faculties, without dementia or palsy, exists independently of softening or compression of the brain; and that dementia or extinction of the intellectual powers may depend — 1st, upon sanguineous engorgement of the brain; 2dly, upon effusion of serum between the membranes or in the ventricles; 3dly, upon extravasation of blood between the membranes or in the substance of the brain; 4thly, upon softening of this organ; 5thly, on atrophy of it; 6thly, on induration of it; and, 7thly, upon exhaustion of its vital influence.

243. ii. Alterations in the Thoracic Viscera. — *A.* The *lungs* are diseased in a very large proportion of the cases of insanity which terminate fatally. The proportion has been differently estimated by the writers already noticed. M. Georget declares that he has found organic changes in the lungs in at least three fourths of the cases which he had examined; and phthisis to have been the cause of death in more than half the lunatics in Salpêtrière. He describes the pulmonary disease as always chronic, and often so obscure as not to be detected until the body is inspected. In these cases, the patient neither coughs nor expectorates, and he makes no complaint: he wastes, gets weak; looseness or constipation succeeds; he dies; — these changes take place slowly. Yet, notwithstanding the absence of cough and expectoration, excavations are found in the lungs after death. But instances of latent phthisis occur independently of insanity. When, however, both maladies are associated, the latter is more frequently sympathetic, or dependent upon the constitutional disturbance caused by the pulmonary disease, than is generally supposed; and it then sometimes does not appear until the softened and absorbed tubercular matter has contaminated the circulation, and thereby disturbed the functions of the brain. I have observed in persons predisposed to insanity, as well as in others, that, when tubercles are developed in the lungs, and when softening and ulceration follow without any communication having been made with a bronchus, the progress of the disease is generally latent. The tubercular softened matter undergoes changes during its retention; causes thickening or condensation of the parietes of the cavity containing it, even whilst the cavity continues to enlarge, and, if it be not evacuated by the bronchi, neither cough nor expectoration will be present. But the constitutional disturbance caused by the accumulated matter, as well as by the organic lesion of the part containing it, and still more by the absorption of a portion of it into the circulation, will so disturb the organic nervous functions, as to occasion, first, functional disorder, and consecutively, even organic lesion of such organs as may be most prone to disease from either an original or an acquired predisposition.

244. *B.* The *heart* is often changed in structure, in fatal cases of lunacy. Indeed, all the lesions of which this organ is susceptible, have been found in the bodies of the insane; but hypertrophy, passive dilatation, and softening, of the parietes of the cavities, seem to be the most frequent. The proportion of cases in which organic alterations of the heart have been found, has been differently estimated by writers. Romberg (Nasse's *Archiv. f. Med. Erfahr.* 1817.) believed that five out of seven bodies present lesions of this organ; and M. Foville considered that five out of six display alterations either of it or of the great vessels.

245. iii. Alterations in the Abdominal Viscera. — *A.* The *digestive mucous surface* very frequently presents evidence of inflammatory action, especially as respects certain of the consequences of this state. M. S. Pinel met with inflammatory appearances in this situation in 51 out of 269 bodies of lunatics; and of these there were only 13 of disease of the other abdominal viscera. These appearances have been also observed in a number of cases by Prost, Percival, and Guislain. — The frequency of displacements of the *colon*, first insisted upon by Esquirol, and especially with reference to melancholia, has already been attended to (§ 119.); and has been remarked also by Bergman, Müller, Annesley, and Guislain. In most of the cases described by Esquirol, the displaced colon presented none of the consequences of inflammation. In some of the instances observed by Percival and Bergman, the colon was contracted or more or less reduced in calibre through a great part of its length; in others, it was in parts dilated and contracted, as well as displaced. M. Guislain attributes both the displacement and the contractions to inflammatory action; — the latter most probably arises from this cause; but the former cannot always thus be accounted for. From the few instances which I have had an opportunity of observing, and from the history of many of those which I have seen recorded, it seems probable that most of the changes observed in the colon have been consequent upon asthenic inflammatory irritation, with diarrhœa, and occasionally with a dysenteric or an irregular action of the bowels, which had existed at some time or other during the course of the mental disorder, and especially at a late period of its progress. Dr. Percival (*Dublin Hospital Rep.* vol. i. p. 144.) observes, "that, on the dissection of cases of insanity which have terminated fatally from chronic diarrhœa, the intestines generally exhibit an extensive mass of disease. The mucous membrane is inflamed, thickened, and partially eroded, and the area of the canal diminished, often considerably, in the lower intestines." The mesenteric glands are often found more or less enlarged and indurated. In addition to these changes, hæmorrhoidal tumours and fistula in ano are not rarely met with in dissections.

246. *B.* Although much importance was formerly attached to disorders of the *liver* in causing insanity, yet the researches of recent writers do not tend to confirm the frequency of this connection. Esquirol, S. Pinel, Guislain, and Foville

found comparatively few cases which presented organic changes in the liver and biliary apparatus. It is probable that lesions of the liver, in connection with insanity, are more frequent in this country than in France, when we consider the influence of the abuse of ardent spirits in causing both insanity and liver diseases. In a case attended by Dr. **SUTHERLAND** and myself, at the time of writing this, the liver is greatly enlarged. The frequency, indeed, of biliary disorder in the insane cannot be doubted; and the occasional association of organic lesions of the biliary organs with mental disorder will be allowed. The chief doubt, in cases where these organs present alterations, will be as to the nature of the connection; for it will be admitted, that disease of the liver will sometimes affect the functions of the brain sympathetically, and that disease of the brain will exert a similar sympathetic influence upon the functions of the liver; and hence the priority of affection of either of these organs will not readily be ascertained.

247. *C.* Alterations of the *gall-bladder*, *calculi* in this viscus or in the hepatic ducts, lesions of the *peritoneum* and *omentum*, of the *mesentery* and *mesenteric glands*, of the *pancreas* and *spleen*, of the *kidneys*, and of the *uterus* and *ovaria*, have been severally found in the boidies of the insane, by **BONET**, **SCHULZE**, **MARCARD**, **OBERTEUFFER**, **PIDERIT**, **JONES**, **PERCIVAL**, **POWELL**, **STARK**, and others; but these have probably been accidental lesions, although they may, in a few instances, have had some influence in causing mental disorder, particularly in persons otherwise disposed to it, by affecting the organic nervous energy in general, and especially that portion actuating the brain.

248. VI. **CAUSES OF INSANITY.** — Few subjects are of greater importance than a just recognition of the numerous causes of insanity,— of their individual and combined modes of operation,— of the influence they exert in various forms of succession, — and of the progressive changes they induce before the effect upon the mind is fully developed. And the importance of the matter is not limited to its bearing upon the treatment of the malady; but is even still greater in respect of prophylactic measures, and of rational plans of mental hygiene. In discussing this subject, I shall consider —*first*, the predisposing causes, or the numerous circumstances which render the mind more susceptible of, or prone to, disorder, than in its natural and healthy state; and, *secondly*, those causes which more immediately produce or excite the disorder. And it must not be overlooked, that whilst the individual influences comprised under the former class are often variously associated in creating a susceptibility or proneness to mental disorder, the occasions or causes belonging to the latter class frequently act also in conjunction, or in immediate succession.

249. i. **THE PREDISPOSING CAUSES** are the most important objects of study, particularly in respect of their beaing upon hygienic and prophylactic measures. The prevention of so terrible an infliction, as insanity is, must be even of more importance than its cure; since the person who has once been insane, seldom wholly regains his former social position, but is regarded with more or less suspicion, and a union with him is avoided by prudent families. The discussion of this class of causes assumes, moreover, increasing interest and importance, when we consider, that many of the circumstances comprised by it are of more frequent occurrence now than formerly, and are more influential in exhausting, weakening, and dissipating the mental powers in the present state of society, than in former epochs of civilisation; and that several of them may be even viewed as altogether arising out of existing social relations.

250. *A. Constitutional predisposition* is amongst the most predisposing causes of insanity. It may arise —*first*, from a certain conformation, temperament or physical and mental constitution, derived from the parents, — or, *secondly*, from an original predisposition or conformation, independently of disease in any of the parents, — or, *thirdly*, from a state of constitution gradually acquired, or arising out of the continued operation of causes which deteriorate or otherwise change the organic nervous and vital powers, and consecutively the digestive, assimilative, and effective functions. In the *first* of these modes, the predisposition is transmitted from the parents: in the *second* and *third*, it is generated *de novo*, and subsequently admits of transmission to the offspring, although not so certainly as in the first case.

251. *a. Hereditary predisposition.* — M. **ESQUIROL** states, — and the circumstance is confirmed by the observation of others, — that persons born before their parents had become insane, are less liable to mental disorder than those born after it has manifested itself; and he further observes, that the morbid tendency, or the actual disease, where it is transmitted hereditarily, is apt to show itself in different individuals of a family at a particular period of life. Instances illustrative of this latter circumstance have been adduced by him, and by Dr. **BURROWS**, MM. **FALRET**, **GEORGET**, and others. The hereditary predisposition to insanity, M. **ESQUIROL** observes, is not more surprising than the predispositions to gout, phthisis, or other diseases. It may be traced from infancy; and it even explains a number of caprices and irregularities which, at a very early period, ought to put parents on their guard against the approach of insanity, and to guide them in the education of their children. In such cases, the education should tend to render the body robust, and to give tone to the nervous system. The constitution of the offspring should be changed as much as possible, by placing them in circumstances different from those which surround them, or which have influenced the constitutions of the parents.

252. In some instances, one particular form of insanity is transmitted; either dementia, mania, melancholia, or states of mental disorder followed by suicide, being thus observed in the same family. The particular variety of insanity evidently depends upon the temperament, which, with the predisposition to this disease, is derived from the parents. Not only the same form of mental disorder, but also the same physical disease complicating it, or terminating it, are apt to appear in the same family, more generally, or even exclusively; yet there are frequent exceptions to this rule. Where an hereditary disposition exists, different grades of the disorder, rather than different forms of it, are commonly observed, — in one, merely various eccentricities; in another, partial disorder of the moral powers; in a third, disorder of the understanding; and, in a fourth, mania, dementia, &c. In families, also,

in which insanity is hereditary, there is occasionally observed a greater tendency to diseases of the nervous system, than in other families, — as, to epilepsy, chorea, convulsions, palsy, &c. Dr. Prichard justly believes that a constitutional tendency existing hereditarily, or arising in the other modes about to be pointed out, is more important, in respect of the frequent occurrence of insanity, than all the other causes taken together. It cannot be said, with propriety, alone to give rise to mental disease, without any exciting occasion; but, if it be very strong, mental disorder will follow the operation of ordinary or very slight causes.

253. Dr. Burrows remarks, that Esquirol assigns only 152, out of 264 cases, in his private practice, to this cause; but that an hereditary predisposition existed in six sevenths of the whole of his own patients. The most exempt from this taint were those whose mental disorder had a sympathetic origin; as in puerperal mania. Out of 57 cases of this latter affection, he could trace an hereditary taint in only about one half. But, where it existed, the disorder was more apt to return. Dr. Burrows considers that this cause is more common in the higher, than in the lower classes; as the former most frequently marry in their own rank, or even in their own families; and that wherever the system of clanship, or family connection, has been most strictly preserved, there it most prevails. Examples of this are said to have been numerous in the old Highland families of Scotland; and Boëthius mentions some very stringent measures which they adopted, to preserve from hereditary maladies, or rather to prevent the procreation of those who might be tainted by them. That hereditary influence is less common in the lower classes, than in the higher, is shown by Sir W. Ellis's report of the Middlesex Lunatic Asylum. There, only 214 cases, in which the disease was inherited, were ascertained, out of 1380 patients admitted; and for 125 of these cases, no other cause of the malady than this could be assigned. It has been supposed, that numerous instances of insanity occur among the Jews, from the circumstance of their having kept themselves more free, than all other races, and for a longer time, from intermarriage with strangers. I believe that mental disorders are frequent among them; but other causes may contribute to the frequency. Dr. Burrows states, that the youngest insane patients he ever had, belonged to a family of this race; and that in it he has observed the father and mother and six of their children insane. He further remarks, that insanity is very prevalent among Quakers, who usually intermarry in their own fraternity.

254. It may be presumed, that, when an hereditary predisposition to insanity exists in both sides of a family, the risk to the offspring will be much greater, than when it is in one side only; and that, when this latter is the case, the child, who bears a very marked resemblance, in constitution and mental character, to the parent exempt from hereditary taint, will be most likely to escape the mental disorder; and the hereditary disposition will fail of being perpetuated by him, unless reinforced by a similar taint, by marriage. But the child that most resembles the tainted parent will be the most liable to experience, and to propagate, the mental malady.

255. There are two points respecting which opinions are often required from physicians,—namely, whether or not a person born of parents who have never themselves been insane, but who, one or the other, is descended from a family thus afflicted, may propagate the malady to his offspring? — and whether or not a child born before insanity had appeared in either parent, is as liable to become insane, as one born after the malady was developed? The *first* question, Dr. Burrows believes, should be answered in the affirmative, because he has met with insane persons, neither of whose immediate parents had themselves been insane, but some of the progenitors, or an uncle or aunt, on one side or other, had been so afflicted. I have known cases, where the nearest progenitors to the patients, who had been disordered in mind, were grand-aunts or grand-uncles. The *second* question has been partly answered above, (§ 251.), by M. Esquirol. But Dr. Burrows considers, that a child born, either before or after the accession of insanity in the parent, provided that parent's progenitors or relations of blood had been insane, is liable to the malady; but that, if the insanity of the parent were adventitious, and not hereditary, the child born before mental disorder had appeared, will not have it by inheritance: how far a child born after the occurrence of adventitious insanity, is liable to mental disorder, is decided with difficulty. This writer believes that, whether it be adventitious or hereditary, once occurring, the morbid diathesis is thereby stamped, or generated.

256. *b.* The offspring may possess a *connate predisposition* to insanity, although neither of the parents, nor of the grand-parents, nor any member of their families, had been the subject of it. Burton long since remarked, upon the authority of the older medical writers, that the offspring procreated of parents when they were far advanced in age, are more subject, than others, to melancholy madness. There can be no doubt, that whatever produces enervation or debility in the parents, will occasion a certain amount of predisposition in their children to nervous affections and to mental disorder; and I believe that habitual drunkenness, or the abuse of spirituous liquors, by either parent, and especially by the mother during gestation and lactation, causes numerous diseases in the offspring, and more particularly disorders of the functions of the brain, and nervous system in general. It also is very probable, that the children of persons who have been weakened by premature or unnatural sexual indulgences and vices, or who are gouty, hypochondriacal, hysterical, or otherwise debilitated, will be more susceptible of the operation of the exciting causes, than the offspring of those who are constitutionally robust and healthy. M. Esquirol affirms, that many facts have been observed by him, proving, that a strong predisposition to madness has arisen from fright or terror sustained by the mother during pregnancy; and that marked cases of this kind occurred during the French revolutions.

257. It has been long and generally supposed that marriages within a confined circle, as between cousin-germans, have the effect of impairing both the mental and constitutional powers of the offspring. The opinion seems well founded, and is undoubtedly just, if the breeding in-and-in be continued for two or more generations. The children of such families often die in infancy or

early youth; are frequently scrofulous, and are liable to hydrocephalic and convulsive diseases; and, if they grow up, are frail in body and imbecile in mind, or predisposed to mental disorder. — It is doubtful how far the scrofulous diathesis may dispose to insanity; but I believe that it has a very considerable influence.

258. *c.* That there may be not only — 1st, *an hereditary*, and, 2dly, *a connate*, but, also, 3dly, *an acquired, predisposition of constitution* to insanity, I firmly believe. This last state is quite independent of the two former, and of temperament or diathesis, and is generally the result of the operation of debilitating causes during infancy, childhood, and the periods of puberty and early adult age. Indeed, many of the moral and physical exciting causes may have this effect, when acting in a slight but continued or constant manner. But there can be no doubt, that early indulgences; a tender, sensual, and luxurious education; vicious modes of early instruction; masturbation, and premature or vicious sexual indulgences; exhausting pleasures, and inordinate mental and physical excitements, relatively to the states of nervous and constitutional energy; and various other causes, which debilitate the frame, increase the general sensibility, and augment the susceptibility of the brain and nervous system, — will often develop, to a greater or less extent, a predisposition to insanity, which may be appropriately termed acquired.

259. It has generally been supposed, and poets have sung, that a great genius is closely allied to insanity. This is most erroneous. Persons with a too active and ill-regulated imagination are predisposed to mental disorder; but those who possess powerful intellects, and a vast range of powers and of intelligence, are much less disposed to it than others; and, if they have become insane, the causes have been of an energetic kind, and overwhelming from their activity or association.

260. *B. Temperaments, &c.* — Persons of the melancholic temperament are more liable to the melancholic states of insanity, than others; those of the nervous temperament, to mania, dementia, and monomania; and those of the sanguine, or sanguineo-nervous, or irritable temperaments, are attacked more frequently with mania, than with any other form of mental disorder. M. Esquirol observes, that, when persons of the lymphatic or phlegmatic temperaments, or of a pale exsanguineous habit of body, are affected with mania or monomania, dementia or incoherency is more liable to supervene in them, than in others. This form of insanity is also likely to follow in persons of a full habit of body, with a thick head and short neck. — Mental disease pursues a somewhat different course in persons of different temperaments. Choleric or warm constitutions, or those with black hair and eyes, and vigorous frames, become violently maniacal, but experience a shorter disorder, and more frequently terminating in a marked crisis, than others. Individuals of a fair, pale complexion, with light hair, fall more readily into chronic mental disease: the dark-haired are liable to become gloomy monomaniacs; red-haired lunatics are disposed to violence, and are treacherous and dangerous. He gives the following table of the general appearances of a number of lunatics: —

External habit of body	Of the medium fulness of habit	122
	Thin or emaciated	60
	Fat	6
Height	Tall	102
	Short	19
The eyes	Chestnut or brown	102
	Blue and light	98
	Black	17
The hair	Chestnut	118
	Fair or flaxen	39
	Grey or white (aged)	36
	Black	31

261. *C.* The *form of the head in lunatics* has attracted the attention of Greding, Pinel, Georget, Gall, Spurzheim, and others. M. Pinel believed that there are certain peculiarities in the shape of the skull, frequently observed in the insane, and particularly in cases of dementia and idiotcy. The two most prevalent forms which he specifies, are — 1st, a laterally compressed shape of the head, giving a very long diameter from the occiput to the forehead; 2dly, a short and almost spheroidal form, — the above diameter being shorter than usual. He could not, however, detect any mental conditions corresponding with these opposite shapes. M. Georget states the results of the examination of upwards of 500 heads in the collection of M. Esquirol. One half of these presented nothing remarkable, being regular and well formed. The other half were more or less peculiar in the form and appearance of the skull, and in the thickness, density, and organisation of the bones composing it. Some skulls were unequally developed, — one side being more arched and larger than the other, especially the right. Others were somewhat oblique, — one side of the head being too forward, and the other much behind. I have seen instances where these two malformations were conjoined. M. Georget found some skulls in this large collection, in which the antero-posterior diameter was not more extended than the lateral: in these, the cavity was much elevated, especially in the posterior part. The cavities of the base of the skull presented likewise inequalities: those of one side were sometimes larger than those of the other. Persons who have contracted heads, particularly as now described, not only are more liable to insanity, than those whose heads are well formed, but lapse more readily into a state of dementia or fatuity, and are consequently less curable than others. It is chiefly in these hopeless forms of general insanity that these irregularities of the form of the head are observed. In *idiots*, as I shall show hereafter, these malformations are still more remarkable.

262. *D. Sex.* — The ancients, and especially Cælius Aurelianus, supposed that insanity occurred more frequently in males than in females. Recent investigations, however, have shown this not to be generally the case, in modern times. Dr. Prichard quotes M. Esquirol, as stating the proportion of insane females in France, to insane males, to be 14 to 11. M. Voisin considers the proportion as 13 to 10. In all Italy, the proportion is different — it being about 5·65 males to 5·00 females. M. Guislain states, that in Holland and Belgium, the number of lunatic females, to males, is as 34 to 29. Dr. Prichard assigns the proportion in Great Britain and Ireland, of male to female lunatics, as 13 to 12; and observes that, in England, the number of insane men, compared with that of women, is more considerable than in Scotland and Ireland; and this excess on the side of the males is greater, according to Dr. Burrows, in the higher than in the lower classes of society.

M. ESQUIROL confirms this observation in respect of France; and further states that, in the North of Europe, — in Germany, Denmark, Norway, and Russia,— the proportion of male to female lunatics is as 3 to 2. Dr. JACOBI furnishes nearly the same results in regard of Prussia. In the United States of North America, the number of insane males is stated to be much greater than that of female lunatics. In the States of New York, Pennsylvania, and Connecticut, the proportion of the former to the latter is nearly 2 to 1. In summing up the results of his inquiries obtained from various parts of the civilised world, M. ESQUIROL finds that the general proportion of insane males to females is about 37 to 38.

263. The occurrence of insanity among females is partly owing to the nature and vices of their education; to their greater sensibility and keener feelings; to the restraints imposed upon their desires and emotions; to the crosses, chagrins, and disappointments to which they are liable; to reading romances and novels, and thereby exciting the imagination, without improving the reasoning powers; to the addiction to music, and the want of salutary and invigorating occupations; and to the life of celibacy they are often doomed to lead. These, and various other moral causes, about to be noticed, contribute remarkably to the production of insanity among females.

264. The physical causes also operate energetically in producing insanity among this sex; but they are chiefly disorders of the sexual organs. Irritation of the uterus, or of the nerves supplying it, and its appendages; suppression, retention, or inordinate flow of the menses; and various organic lesions of these parts; have a very marked influence, sympathetically, upon the functions of the brain. Many of the moral causes, and emotions of mind, have but little influence, until they have first disordered the functions of the womb; and as soon as this organ is disordered, it reacts upon the brain, and heightens the effects of the moral emotions. In such cases, as well as in many others common to both sexes, the moral causes are often insufficient to induce the mental disorder, until they have first occasioned physical disturbance in some organ; which disturbance, from its sympathetic influence upon the brain, becomes an additional cause of the disorder. Females, however, are often so circumstanced as to experience very serious disorder of the circulation of the brain, from energetic mental emotions, occasioning an immediate effect upon the manifestations of this organ, before any disorder can appear elsewhere. And, in some cases, the consequent disorder is produced almost simultaneously in both the brain and the functions or state of the uterus. We observe this especially in the puerperal states, and, still more particularly, soon after delivery.

265. M. ESQUIROL remarks, that females become insane at an earlier period of life, are more liable to lapse into dementia, and are more disposed to religious insanity and to erotic delirium, than males; and that all varieties of insanity, in them, are generally complicated with hysteria. Males, on the other hand, are more liable to mania and violence; they are more dangerous, and more difficult to restrain: women are more noisy; cry, and talk more; are more dissembling, and less readily confide in those about them.

266. *E. Age.* — Insanity, in the forms which have been described, is rarely observed before the age of puberty. Imbecility and idiotism are always observed in childhood; but the instances, in which any form of true insanity has occurred at any epoch before puberty, are very few. They have, however, been recorded by J. FRANK, Dr. HASLAM, M. FODÉRÉ, M. ESQUIROL, Dr. PRICHARD, and one case occurred in my own practice, and that was caused by fright. Two cases mentioned by M. ESQUIROL proceeded from the same cause. He met with one case of melancholia complicated with marasmus, in a child eleven years of age, remarkable for his large head and mental precocity. Instances, however, more frequently occur of children becoming melancholic, and even delirious, from jealousy and envy, than is generally supposed. They sometimes are thus affected, although often only temporarily, by seeing the attentions of those to whom they are much attached, bestowed upon others; and by being outstripped in obtaining distinctions at school.

267. After fifteen years of age, insanity ceases to be a rare occurrence. About the period of puberty, in females, or when the catamenia are about to be established, melancholia and mania occasionally appear, and especially if the growth be rapid, and the catamenia are retained, suppressed, insufficient, difficult, painful, or irregular. In these cases, and still more so at a later period, hysteria is generally attendant upon the mental disorder. During the first few years after puberty, in the male, mania and melancholia not infrequently occur; the former generally from the excitement of sexual desires, the latter from masturbation or venereal excesses. M. ESQUIROL remarks, that mania, in all its forms of excitement, appears chiefly in early life; melancholia, in middle age; and dementia, in the advanced epochs of existence. In youth, insanity assumes an acute and violent course, and often terminates by a remarkable crisis: in middle age, it is more prone to become chronic, and is oftener complicated with disorder of the abdominal viscera; but is sometimes resolved by hæmorrhage from the hæmorrhoidal vessels, or by diarrhœa. At an advanced age, it is apt to pass into dementia, and to be complicated with paralysis, apoplexy, &c.; and recovery is much less to be expected. However, dementia may occur in the young; and very aged persons may be attacked by mania, and recover from it, — but these are only exceptions from the rule just stated.

268. The *ages* at which insanity most frequently appears, are — that between 30 and 40; next, that from 20 to 30, and from 40 to 60. M. ESQUIROL, however, states, that the maximum number of admissions of cases of insanity take place from 30 to 35 years of age: that each five years, from 20 to 35, give nearly the same number: that the admissions of males are more numerous from 25 to 30; and those of females, from 35 to 40: that the periods from 30 to 35 follow thereafter, for the men; and from 40 to 45, for the women: and that the admission of males from 20 to 25 years of age occupy the third rank of frequency; whilst those of females hold only the sixth rank. From this it follows, that insanity is most frequent at an earlier age in men, than in women. M. ESQUIROL further states, that the wealthy classes are much earlier attacked — or

rather, are affected in greater numbers at an early age — than the laborious. M. Georget adduces the following calculation of the ages of insane persons, on admission into several institutions in England and France : —

From 10 to 20 years of age	365
20 to 30	1106
30 to 40	1416
40 to 50	861
50 to 60	461
60 to 70	174
70 and upwards	35
	4409

269. Yet, although a greater number become insane from 30 to 40, than at any other age, still the number may not be really greater, relatively to the proportion of persons in society of farther advanced ages ; and hence, 174 instances of the malady occurring in persons aged between 60 and 70, may actually show a greater prevalence of it at that age, than 1416 cases appearing between 30 and 40 years of age. That this, however, is not the case, — and that a greater number, relatively to the proportion of persons existing in the community at that age, actually become insane between 30 and 40 years, — is proved by the number of persons surviving out of each 1000 at successive periods of life. In this country, 410, out of each 1000 born, will reach 30 ; and 345 will reach 39 ; but 220 will reach 60, and 140 will attain 70 ; and if the mean number of those between 30 and 40 thus be 376, and that of those between 60 and 70 be 146, it will be at once manifest, that the number of instances of the invasion of insanity is, relatively to the proportion of persons between 30 and 40 years of age, actually greater at that period.

270. M. Esquirol, however, believes that a proportionably increased frequency of mental disorder, with the advance of age, really does obtain, although the predisposition, thus arising from advancing age, increases in an irregular manner. The increased number of insane persons, he adds, compared with the population of that age, is very striking between 50 and 55 years. From 70 to 75, and from this age to 80, it becomes enormous, owing to the frequency of senile dementia. This is very probably correct ; but it must not be overlooked, that a very large proportion of the cases of hereditary insanity occurs between 30 and 40, or even earlier ; and it is admitted, that these cases constitute the great majority.

271. *F. Education.*—There are few causes which more powerfully predispose to insanity than erroneous education and moral discipline in early age. — *a*. Too great indulgence in childhood, and previously to, as well as during, puberty, and a want of moral discipline then and up to manhood, with neglect of that education, which inculcates, and, indeed, enforces, proper principles of feeling and action, are undoubtedly amongst the most deeply laid foundations of insanity. Persons thus brought up, have their temper, emotions, and moral affections so little under command, — are so subject to ebullitions of passion, to caprices, or violent and fugitive emotions, — are so liable to act from momentary feeling and impulse, — as to acquire a disposition of mind, or moral character, not only most unamiable in itself, but also most prone to marked disorder, when subjected to its more immediately productive causes.

272. *b*. The premature and overstrained exertion of the mental powers is another most important cause of predisposition. In the higher and middle classes of society, the mind is excited much beyond its powers ; and the child, being required to perform too much, with its imperfectly developed faculties, experiences, as a consequence of such premature excitement, increased vascular action in the brain and its membranes, at a period of life most disposed to vascular disorder in this organ ; and the foundation is thus laid for chronic disorder, and especially for chronic inflammatory action of that part of the nervous system with which the manifestations of mind are most intimately allied. The quantity, as well as the diversity and range, of mental exertion, now required from both sexes at a too early epoch of childhood, and during the period which elapses from mere infancy to puberty, while both mind and body are only in an early stage of formation, must necessarily prove injurious, both mentally and physically, — and especially to those who are either delicately constituted, or tainted by any hereditary disposition to insanity. Therefore, when this disposition exists, not only should premature and overstrained mental exertion be avoided, but also should the feelings, the passions, and the actions be subjected to strict discipline — to a discipline not too harsh or rigid, but rational and consistent. The mind ought to be formed under a kind restraint, and imbued with correct principles, and with a due sense of moral and religious responsibility. In the present day, too much attention is paid to an early cultivation of intellect, and to the mere acquisition of knowledge of facts and phenomena, to the neglect of the education of the moral affections, and of just principles of feeling and of acting. The great ends of education, as now conducted, are, as respects the one sex, the attainment of that knowledge and of that range of information which may enable its possessor most successfully to compete in the general scramble for wealth, for advancement in society, or even for existence ; and, as regards the softer sex, the possession of such accomplishments, and the acquisition of so wide and so superficial a range of ideas, in a very limited period of time, as may strike or captivate, or may be more readily and generally made available in society, and thus become the current coin of the mind in conversation. These objects are pursued in education in a manner but too well calculated to overstrain the early intellect, to exhaust the feeble mind, and to derange the hereditarily predisposed. The mind is engorged with food, not of the most wholesome or digestible quality, beyond its powers of healthy digestion and due assimilation, and even before these powers are fully evolved ; and hence, but too frequently, follow disorders, varied in extent and intensity, of its most important and effective manifestations or functions.

273. *G. Climate and Seasons.* — *a*. It is very doubtful what degree of predisposition can be ascribed to climate and seasons, especially as most of the differences in the numbers of the insane in different *climates*, may be attributed to various moral and physical circumstances not necessarily dependent upon climate. In warm climates, and even in Turkey, and other Mahommedan coun-

tries beyond the tropics, and in hot climates, where the minds of the population are under the sway of the Romish and Greek churches, insanity is much less frequent, than in temperate and highly civilised countries. M. Esquirol, in accounting for the greater prevalence of insanity in temperate climates, attributes too much importance to sudden alterations or vicissitudes of temperature. The greater frequency of the malady in these climates is plainly attributable to other causes than this. I believe, however, that a predisposition to insanity, and particularly to connate and puerile imbecility, and to dementia, is to some extent generated by marshy or miasmatous places, particularly in low districts subject to inundations, and in low valleys placed deep between precipitous mountains. There, the mind and body are checked or weakened in the course of development, and the latter early becomes the subject of diseases which impair its vigour and further weaken the powers of mind.

274. *b.* The *seasons*, according to M. Esquirol, have some influence in causing insanity,— but probably more as exciting, than as predisposing, causes. High ranges of temperature seem to have considerable influence in causing or in determining the character or form of the disorder, and particularly mania, or the higher states of the malady. M. Esquirol has given a table of the admissions into the *Salpêtrière*, during each month, for nine years, according to which it would appear, that the lowest number was admitted in January; and that the admissions increased progressively from March till July, when they reached the maximum. They then progressively decreased till October. From this month to March they varied somewhat in number, but not so much as to excite speculation.

275. *H. Professions, Employments, &c.* — *a.* The frequency or infrequency of insanity amongst persons pursuing certain professions or employments, is obviously to be referred to the several circumstances more immediately connected with these employments; but most of these circumstances will be more fully considered hereafter. The learned professions certainly furnish fewer cases of insanity, relatively to the numbers exercising them, than any other class of persons in the middle ranks of the community. This, probably, is owing to the education for the professions, in early life, being such as tends more than any other to develop, and to strengthen, the judging and reasoning powers, without exciting the imagination, or prematurely involving the feelings and passions. Some exceptions, however, may be found among young divines, who, from enthusiasm or anxiety respecting the state of their minds, have become partially or altogether insane; but such cases are comparatively rare amongst the soberly and regularly educated.

276. *b.* I believe that insanity is most prevalent among artists, musicians, and actors, relatively to the number of persons pursuing these occupations. This frequency obviously depends upon a great variety of circumstances, many of which will be found amongst the moral causes of this malady. In the present day, — for it was not so formerly, and in the palmy days of Italian art, — few artists receive an education, in early life, calculated to develop, or to strengthen, the intellectual and reasoning powers. The imagination is early and almost exclusively exercised; and many of the instinctive moral affections of mind (see note, § 66.), which exert so powerful an influence upon mental sanity, are so often brought into inordinate action, without the due control of sound judgment and strict principle, that first partial, and ultimately general, insanity is the more liable to appear. Besides, artists, in the wide acceptation of the word, are liable, in the exercise of their art, to sustained excitement, not merely of the imagination, but also of the feelings and passions, — to a certain tension of the mind, — tending to exhaust, and at length to disorder, the intellectual powers. There are few classes, moreover, who entertain more extravagant ideas of their own merits, than those to whom I now refer; and who, consequently, are more liable to jealousy, envy, disappointments, and wounded self-love. Poets and literary men are liable to the same imputations, — entertain the same ideas of themselves, and of others, as those who may be classed under the general denomination of artists; but, in general, their education is sounder, and better calculated to strengthen the reasoning or controlling powers of mind. In all, the sedentary occupations, the insufficient exercise in the open air, and the irregularities of living, or the alternations of abstinence and dissipation, aid the moral causes of the malady, in this class of the community.

277. *c.* It must necessarily follow, that insanity will vary in frequency, in different professions and employments, with the degree in which they respectively call into exercise those moral emotions or causes on the one hand, and the physical circumstances on the other, on which this malady has been found more especially to depend. Next to artists, in the liability to mental disorder, may be ranked, according to the tables of M. Esquirol, merchants and traders, and military men. This may be expected, especially if brokers or speculators in the funds or share markets are included under this head: and, indeed, merchants, traders, manufacturers, and speculators or gamblers in all kinds of securities or pseudo-securities, have, in recent times, so entirely fallen within the same category; and are, from the governor or director of the most powerful corporate bodies in the world, down to the very humblest adventurer in a bubble company, so generally and completely subjected, from the nature of their engagements, — from the epidemic scramble after gain at all hazards,— to alternate excitement and depression — to elated expectations and painful anxieties — to hopes and fears — to fortunate anticipations and humiliating disappointments; and have the prospects of being, or are, in fact, one day as rich as Crœsus, and the next even poorer than the meanest slave, — that the mind, which probably has never been strong, nor duly strengthened by wholesome education, and by the early inculcation of sound principles of feeling and acting, at last experiences, and manifests, the shock, in some one of the various forms of insanity. Shall the medical philosopher — contemplating the present state of society, seeing these things, and knowing the circumstantiality with which insane acts and crimes are published, commented upon, and rendered interesting to vulgar tastes and minds — be surprised at the existing prevalence of insanity, and one of its most common results — suicide? The weak, the injudiciously tutored, and the pampered, mind, after a career of ill-deserved prosperity, — a prosperity often as iniquitously enjoyed

as unjustly earned, — not infrequently experiences a reverse, which it is incapable of enduring without more or less of mental disorder; but the reverse is commonly attended by circumstances involving also many confiding and innocent persons; and thus more than one sustains a shock, before which reason is shaken or entirely overthrown.

278. I. *Previous attacks of insanity, or other diseases of the brain,* greatly increase the susceptibility of mental disorder. Although recovery from insanity often takes place without any subsequent manifestation of mental disease, and although even repeated attacks have been sustained, and a complete and permanent restoration has occurred nevertheless,— yet much more frequently madness leaves the person, who has once been its subject, much more prone to a return of it. In many cases, the patient continues, for a long period after recovery has apparently been established, more irritable and excitable than previously to the attack: he is irascible; very susceptible of impressions; and less capable of application to business, or of mental exertion. After every successive attack, this change in temper and character becomes more manifest, until the disease assumes a remittent, and ultimately a continued, form; a state of permanent incoherency or imbecility ultimately supervening.

279. Inflammations of the brain or of its membranes, frequent attacks of epilepsy, apoplectic and paralytic seizures, and fevers with predominant affection of the brain, often predispose to mental disorder. Indeed, these maladies are not infrequently both attended and followed by delirium, or some form or other of insanity, which generally disappears in a few days, or at most weeks, after the primary malady has evinced signs of amendment, or after recovery from it has taken place. When either of these cerebral diseases are thus complicated, the danger of the recurrence of a temporary, or a severe, or even a permanent, attack of insanity, or of a return of the primary disease, attended by a more complete overthrow of the mental powers, is much heightened. This is especially the case in respect of epilepsy, particularly when slight partial paralysis with mental disorder follows the fit. In such cases, incoherency, imbecility, and, ultimately, fatuity, often successively appear. In some instances, where the epileptic paroxysm is attended by violent mania, which subsides in a few days afterwards, the mental derangement gradually becomes permanent, and either supersedes the epilepsy, or continues complicated with it. When insanity is thus caused by epilepsy, sullenness, sudden irascibility, with a disposition to commit the most atrocious acts, and various manifestations of moral disorder, often characterise the malady.

280. ii. THE EXCITING OR PRODUCTIVE CAUSES. — Certain of the causes which have been already considered, may, from their nature or intensity, give rise to insanity, without the aid of any exciting occasion, or, at least, of any so marked as to attract the notice of the patient's friends. On the other hand, many of the causes about to be noticed, either from their slight but often combined action, or from their continued influence, actually predispose to, rather than excite, insanity; or they affect so slowly and imperceptibly the mental powers, as well as the bodily functions, without giving rise to any sudden or manifest shock of the mind, as to change the character or constitution of both, and thereby fit or prepare them for the injurious impression of causes which would otherwise have been entirely innocuous. — The exciting causes have been very commonly divided into *moral* and *physical;* and under these heads have been also comprised, by some of the best writers, the causes already considered, as creating a predisposition to mental disorder. And when the circumstances just alluded to, respecting the operation of these causes, are considered, there can be but little fault found with this arrangement. Some authors have differed as to the comparative influence of *moral* and *physical* causes in occasioning this malady. But the difference has arisen chiefly from the more extended signification assigned to the latter term by some, and from their having comprised under it various important causes kept entirely apart by others, — and especially the greatest of all causes — hereditary predisposition. Leaving this, therefore, out of the arrangement, or, rather, considering it separately, there can be no doubt of the influence of the moral causes, in the production of insanity, being much greater than that of the physical. Still the matter is not so satisfactorily solved, especially by referring to statistical tables, as may be imagined. For, although it may have appeared, from the information received, that the malady was produced by some moral cause; yet there may have existed at the time, or closely upon it, some physical disorder, and especially some functional disturbance of the digestive, assimilative, and excreting organs, or a morbid susceptibility of the nervous system, or both, without the existence of which the moral affection may have been quite inoperative. Agreeing, however, with HEINROTH, PINEL, GEORGET, GUISLAIN, PRICHARD, and others, as to the great and predominant influence of moral over physical causes in the production of insanity; still, even in the cases where they seem to have been most influential, various physical or functional states or disorders may have existed, so as to predispose the nervous system to be affected by them; or the moral emotion may have first occasioned some severe physical diseases, of which the mental disorder was the more immediate effect.

281. In proof of the predominance of moral over physical causes, most writers refer to the great frequency of insanity among highly civilised people, and its almost entire absence from savage or barbarous nations. The data, however, are not to be depended upon, as respects savage communities. It is not correct to say, as many have, that insanity is unknown among them. It certainly is comparatively rare, or very seldom occurs, — but it does occur amongst the greatest of all savages; various circumstances, however, preventing persons in this state from being long troublesome to their friends or to the community, — or, in other words, once an individual "loses his head," — as the being insane is very generally termed, — he is soon got rid of; and his insane acts, before his state is recognised, often directly or indirectly terminate his existence. On this subject Dr. PRICHARD remarks, that, "in a barbarous state of society, the passions are under no restraint — the emotions are impetuous; hatred and malignity are in perpetual exercise; the fierce and sensual desires which are common to mankind and the inferior tribes, are indulged without limit. Nor

are the intellectual faculties without their exercise in carrying on the stratagems of barbarous warfare. We should conjecture that such a state of society, in which the passions are in perpetual and violent agitation, would not infrequently produce insanity." Still, I contend that these are not the chief moral causes of which this malady is so frequently a result; and that many of the physical disorders, which either predispose to, or produce, mental disorder, and which remarkably aid the operation of moral causes, are not very common in savage communities. If we contrast the emotions which powerfully affect the human mind in civilised society, with those which have been just noticed, the consequences resulting from the former to the mind itself, may be, in some measure, anticipated. When we consider the premature and excessive exertion of the faculties in highly civilised countries; the restraints imposed by social institutions and legislation, and the consequences which often arise out of them; the diversity of interests and of feelings brought into action by many pursuits, upon which wealth, honour, and even existence, depend; the long-continued anxieties, griefs, disappointed hopes, the family dissensions, and injured or lost affections; the chords of feeling too intensely strung; the prolonged or intense mental exertion; the continued tension of the imagination, or of the intellectual powers; the pride, ambition, and humiliations; the distractions of the mind by religion, by worldly speculations, and diversified engagements; the sudden reverses, the jealousies, and the numerous causes continually impressing the moral sentiments and affections, and increasing the susceptibility of the nervous system, as well as disordering the general health, — when we contemplate the prevalence, the frequent recurrences, and often the almost constant operation, of all these circumstances in civilised life, we cannot be surprised at the effects produced by them upon the mind and nervous system; especially when we find that they seldom act singly, but generally in combinations, or associated with various predisposing and exciting or determining causes.

282. There are, also, other considerations, not to be overlooked in attempting to account for the greater prevalence of insanity in civilised than in savage communities. Children of weak physical powers are seldom reared among the latter; and the higher intellectual faculties, and the finer and more elevated moral affections, — especially the powers of intellection, and the rational emotions of mind (see note, § 66.), — are imperfectly developed in them, and consequently less prone to experience or to originate mental disorder. In barbarous societies, the mind retains much of the constitution and character presented by it in childhood and boyhood in more civilised communities: it is incapable of comprehensive views and combinations of thought, or of prolonged exertion; it retains the sanguine disposition of youth, and is little susceptible of care and anxiety, and thinks of little, but of present gratification and ease. On the other hand, whilst civilisation develops all the finer emotions and affections, all the higher and more reflective faculties, and augments the susceptibility of the moral feelings, as well as the general sensibility, it tends also to disorder them the more, owing to numerous resulting circumstances, which inordinately excite or seriously disturb them, and which thereby often ultimately overthrow them altogether.

283. M. Georget, however, most probably over-rates the influence of moral causes in the production of insanity. He believes that 95 out of 100 lunatics have become so from the operation of the affections and moral emotions; and he states this to have been the opinion also of M. Pinel. It is in the age, he adds, in which the mind is most susceptible of strong feelings, and in which the passions are excited by the strongest interests, that madness is principally displayed. It is chiefly, however, in the higher and middle classes of society that the moral causes are most productive of insanity. This is shown by the researches of Esquirol, Georget, Guislain, and others. It is in them that the influence of civilisation, in increasing the frequency of the malady, is especially manifested; thus proving the justness of the remarks which I have ventured above, and which are partly founded upon my observation of the state of society in savage communities. Amongst the lower orders, physical causes have more influence than in the higher; and, of the moral causes, an unrestrained sway of the temper and passions is the most manifest. Physical causes are, according to the writers just mentioned, more influential in females than males; and, in the former, amongst the lowest classes, I would add, that violence of temper is the most productive moral cause of the malady. — In further considering the *exciting causes*, I shall offer a few observations — 1st, on the more remarkable emotions of the mind, of which insanity is often a consequence; 2dly, on the physical causes of the malady; and, 3dly, on certain circumstances in the general habits and manners, and in the social and political states, of our species, resulting from various combinations of moral and physical causes, which both indirectly and immediately occasion mental disease.

284. *A.* Of certain Moral Emotions. — *a. The more violent passions and emotions,* sometimes, by their sudden or vehement action, more or less disorder the functions of the brain, — especially violent anger, and terror. Unrestrained bursts of temper are very frequent causes in the lowest classes of the community, and particularly in females — in whom it acts either directly on the brain, or consecutively, by first disordering the uterine functions, or in both modes. M. Esquirol, however, assigns a greater influence to fright than to anger; but mania is the form of the disorder which most frequently results from both these causes. Dementia much more rarely is occasioned by them. These emotions are the most intense and the most sudden, of which the human mind is susceptible; and, fortunately, they are amongst the shortest in their duration. The nervous system, and particularly the functions of the brain, are more violently agitated by them than by any other; and in many instances, where no predisposition to insanity exists, fits of convulsion, tremors, and various nervous affections, are caused by them, — especially in weak, nervous, and susceptible constitutions.

285. *b. Care, anxiety, grief, distress, and all the depressing emotions,* are the chief causes of mental disease. In the same category may be included, domestic griefs, and disagreements, family dissensions, ill-assorted marriages, reverses of fortune, disappointments, prolonged fears, men-

tal humiliations, jealousy, wounded self-love. The tables which I shall give hereafter, will show the relative influence of these and other causes in one civilised country. It will readily be admitted, that it is chiefly in communities far advanced in civilisation, that these causes are most productive of this malady. These causes act very generally in combination, either with one another, or with various predisposing and physical circumstances: many of them operate upon the mind slowly and silently, and only by first disordering one or more of the bodily functions. Joy, and the more exciting emotions, less frequently occasion insanity than is commonly supposed. Esquirol states, that the opinion of Mead, as to the frequency of mental disorder from this cause, is not well founded; but he admits the importance attached by Pinel to the struggle between religious and moral principles, and the passions and worldly interests, — a struggle sometimes long sustained, and terminating in impairment of reason, and especially in melancholia. It is not only in their individual, but also in their combined, operation, that the causes of insanity should be studied: and in order that sound principles subservient to rational hygienic and prophylactic measures may be deduced from the study, the various combinations and successions of action should be recognised; and the intermediate changes, mental and physical, ought to be traced as far as the means of investigation may be furnished us. It is chiefly, also, by ascertaining the changes first induced in the functions of important organs, and the succession of morbid actions resulting therefrom, that we can be enabled to form rational or successful indications of cure.

286. *c. Religious impressions, and apprehensions of a future state*, are amongst the most important mental causes of insanity. — *Religious madness*, as it has been termed, has long been an interesting subject to the philosophic physician; and its frequency in Great Britain demands from him a particular notice of the various circumstances connected with it. — I cannot agree with Dr. Prichard, in considering that the number of persons, who become insane from religious hopes and fears, is much less considerable than it is generally supposed to be. The frequency of disorder from this cause varies remarkably in different places and in different times; and the mischief often becomes either endemic or epidemic, from every fanatic, or ambitious preacher, who is desirous of acquiring notoriety, or of being the originator, or the leader, of a particular sect, — from any one, however slightly imbued with religious knowledge, or however ignorant, who wishes to be distinguished amongst those who are equally ignorant, but more honest, with himself, — and from any one, who, already partially insane, believes himself inspired, and called by the Almighty to instruct and convert men, before he is himself even partially instructed, — being permitted to "deal damnation round the land," and to excite the feelings and the fears, or to distinguish the hopes, of the ignorant, the nervous, the susceptible, and of the hysterical, without any control as to education, doctrines, or religious principles. As the numbers of these adventurers increase or diminish, so do the victims of this encouragement to disturb the minds of the community also vary in number. In this vicious plenitude of liberty, every body enjoys not only entire freedom of thinking and speaking, but also of acting. The rogue who is too lazy to work, is allowed, without inquiry into his knowledge, or belief, and without hindrance on account of character or of the mischievous nature of his doctrines, to harass the feelings, to excite the imagination, and to blight the happiness, of many of those who listen to him. It is not seen, or, if seen, in no way guarded against, that the more dangerous the doctrine, the greater the fanaticism, or the more vehement and impassioned the declamation with which it is promulgated, the more intensely are the uneducated affected, and the mind disordered by it. The more absurd and inflated the harangue, the more frantic the manner, and the greater the outrage on common sense and decency, the moral infection sinks the more deeply, and spreads the more widely, until mental disorder assumes a truly epidemic form. That this is not over-stated, is sufficiently proved by what has taken place recently in this metropolis, by the camp-meetings in America, and by the "revivals" in Scotland and in that country.

287. The frequency of mental disorder from this cause has been insisted upon by Darwin, Perfect, Falret, Jacobi, and others, but somewhat doubted by Dr. Prichard. According to my own observation, I believe this to be a frequent cause of insanity in this country, particularly amongst protestant dissenters, — but of very irregular frequency, owing to the circumstances just alluded to. The forms of disorder caused by it are chiefly theomania, melancholia, suicidal insanity, mania, and mania complicated with hysteria. It must not, however, be supposed that religious feelings are generally the only and sole cause of mental disorder, amongst persons whose minds are much engaged with these sentiments; or that all the cases of insanity, in which the mind is occupied with religious ideas, have proceeded either solely or chiefly from this source. In the great majority, perhaps, of instances, other moral causes, or even bodily disorders, have either predisposed the mind to be influenced by these feelings, or have been associated with them in their operation on the mind. Dr. Jacobi observes, that the original cause of derangement is often some misfortune, or some physical influence, — religious ideas rather determining the morbid effect upon the mind, than actually originating it. There is much truth in this, and it is most important in respect of treatment. I have witnessed several cases illustrative of the justness of this view; and, by acting upon it, they have had a favourable issue.

288. The more civilised the human mind, the more desirous it becomes to form anticipations of the future, or to entertain hopes and fears of good and evil, which are not limited to the present state of existence. In forming these anticipations, the knowledge of our own imperfections, and of our numerous acts of demerit, naturally impart to them a certain degree of gloom or despondency; and accordingly we find, in all civilised ages and countries, that these feelings, when inordinately indulged, — especially during states of physical disorder, or when the mind is already depressed by grief, anxiety, and bereavements, — have caused mental disease. Dr. Heinroth has collected numerous instances from the early fables of Greece,

showing, that madness from this cause was not of rare occurrence in the ages of remote antiquity. The circumstances in the moral nature of mankind, on which religious insanity depends, cannot very materially change, and may therefore be expected always to produce their usual effects; still they may be more remarkably predominant, or very much less so, in certain periods and places, than in others; and that they have been, and still are, thus variable, is well known. Dr. PRICHARD observes, that, in France since the revolution, the influence of religion on the community has been less than it ever was in any civilised country; and French physicians have informed him, that cases of religious insanity have become proportionately rare. M. ESQUIROL states, that the changes during the last fifty years, "in the moral sentiments and habits of the people, have produced more instances of madness in France, than all their political calamities. The change in ancient customs and fixed habits, in old and established sentiments and opinions for speculative theories and dangerous innovations, has contributed to this. Religion now comes forward only as a formal usage on solemn occasions, and no longer affords her consolation to the afflicted, or hope to the desponding. Morality based on religion is no longer the guide of reason in the narrow and difficult path of life. A cold egotism has dried up all the sources of sentiment: there no longer exist domestic affections, respect, attachment, authority, or reciprocal dependences. Every one lives for himself; none is anxious to form those wise and salutary provisions which ought to connect the present age with those which are destined to follow it."

289. An enthusiastic, or a vehement and impassioned, mode of preaching, and declamations abounding with frightful pictures and condemnation, are not confined to any sect; and, in some countries, are as common amongst Romanists as among Protestants and protestant dissenters.—The itinerant missionaries of all sects—of Romanists as well as of Protestants—are remarkable for fanaticism; and for modes of preaching, more calculated to disorder the minds of persons, who are already suffering the ills of life, the depressing passions, bereavements of affection or of fortune, exhaustion of nervous power, and bodily disease, than to afford the consolations which religion is intended to administer in these and other circumstances of distress.

290. The question, which has been often agitated, as to the greater prevalence of insanity among Romanists and Protestants, may seem to bear upon this topic, but not so closely as it may at first appear; for, although mental disorders may be more frequent in the latter, than in the former, it by no means follows that religious feelings are the causes of this frequency, or that the numbers of the insane are greatly increased by cases of this kind. The number among Romanists may be as great as that in Protestants,—other circumstances compensating for the less influence of this cause in the former, than in the latter persuasion. That religious insanity, however, is much less common in Romanists than in Protestants, and especially protestant dissenters, cannot be doubted by any one whose sphere of observation has enabled him to form any opinion on the matter. Dr. HALLARAN (*Pract. Observ. on Insanity*. Cork, 1818, p. 32.) states, that in the Lunatic Asylum at Cork, in which the admissions of Romanists are about ten to one of Protestants, no instance has occurred, within his recollection, of mental derangement in the former from religious enthusiasm; but that several dissenters from the established church have been so affected. The reason of this difference is obvious. The ministers of the Romish church will not allow the minds of their flocks to distrust points of doctrine and discipline,—or to fall into these doubts, which distract the minds of those who are either wavering in their opinions or entertain entire liberty of conscience.

291. Whilst HALLARAN, GUISLAIN, LEUPOLDT, BURROWS, and others, contend for the greater prevalence of mental diseases in Protestants than in Romanists, JACOBI and CHIARUGGI believe that cases of religious insanity are also frequent in the latter. Dr. JACOBI remarks, that the character of religious madness in members of these two communities, and the manner of its accession, are for the most part different. In the lunatic asylums of Roman Catholic Germany, many of the inmates of the lower classes have become religiously mad, from the delusions of a wild and unregulated imagination, excited by superstitious phantasms, through neglect of the culture of the understanding, and the overpowering influence of sensual passions. Dr. PRICHARD has given a table from JACOBI, of the comparative prevalence of insanity in the Romanists and Protestants of the Prussian States on the Rhine; and it appears from it, that the proportion of lunatics in the former, compared with that in the latter, is as 11 to 10; and that the proportion is much higher among the Jews than in these persuasions. Still, this conveys no information as to the comparative prevalence of religious insanity among them.

292. Mr. TUKE's account of the Retreat, the asylum belonging to the Quakers or Friends, furnishes only 3 cases, out of 149, which could at all be ascribed to anxieties connected with religion; and in his list of causes of insanity amongst the inmates of this asylum, pride, ambition, jealousy, rage, debauchery, penury, or care produced by hardships, &c.—causes so productive of insanity in other institutions,—are not even mentioned. The exemption from these prevalent causes of mental disorder are attributable to the strictness of moral education and discipline, to the restraints imposed on the imagination and the indulgence of the passions, and to the absence of enthusiastic excitement on religious topics, in this sect. Still, insanity is as prevalent among Quakers, as among any other sect, relatively to their numbers,—owing, as above remarked (§ 253.), to the increased influence, in them, of hereditary predisposition.

293. From what has been now stated, it will appear that the frequency of religious insanity in different persuasions and sects will depend upon the excess of fervour characterising them. Exuberance of zeal on any subject soon passes on to madness in some constitutions; and on religion, unless tempered by a sound judgment, it is apt to degenerate into fanaticism, and thence into delirium which often becomes permanent. Excessive fervour, or enthusiasm, generally shows itself in religion, when any revolution of opinion or doctrine takes place; and when new lights and new sects arise amongst those who have

received a certain amount of education and religious instruction. Dr. ROBERTSON (*Hist. of Charles V.* vol. ii.) has well remarked, that "when the human mind is roused by grand objects, and agitated by strong passions, its operations are apt to become irregular and extravagant. Upon any great revolution in religion, such irregularities abound most at that particular period, when men, having thrown off the authority of their ancient principles, do not yet fully comprehend the nature, or feel the obligation, of those new tenets which they have embraced. The mind in that situation, pushed forward with the boldness which prompted it to reject established opinions, and not guided by a clear knowledge of the system substituted in their place, disdains all restraint, and runs into wild notions, which often lead to scandalous and immoral conduct. Such was the effect in the first ages of Christianity, as well as at the era of the Reformation. The renunciation of the ancient faith, and ignorance of that which they had embraced in lieu of it, excited converts to acts more resembling insanity, than of that religion which inculcates the purest morality and government of our passions." — Dr. BURROWS states, that he does not recollect an instance of insanity from religion, in any person steadfast to his ancient opinions. Wherever the disorder was suspected to proceed from this cause, it was clearly traced to the adoption of new tenets, which had not been comprehended, and found to originate during the conflict in deciding between opposite doctrines.

294. It must not be supposed, from what I have advanced, that the Christian religion is truly chargeable with causing insanity; it actually has an opposite tendency. Mistaken views, excessive fervour, unfounded fears, and various feelings arising from these sources, are the only causes of insanity in connection with religion. Amongst those who entertain just and sober opinions on religious topics,—who make Christian doctrines the basis of their morals, the governors of their passions, the soothers of their cares, and their hopes of futurity,—insanity rarely occurs. The moral causes of derangement, which would not fail of producing injurious effects on others, prove innocuous in them, for these causes would be met by controlling and calming considerations and sentiments, such as would deprive them of intensity or neutralise their effects. Truly religious sentiments and obligations soothe the more turbulent emotions, furnish consolations in afflictions, heal the wounded feelings, administer hopes to the desponding, and arrest the hands of violence and of despair.

295. In considering how far insanity may have arisen from mistaken views, or ill-regulated zeal, in religion, the influence of sounder Christian doctrines in preventing its occurrence from other moral causes ought not to be overlooked; but this beneficial influence is too often unheeded, from being seldom brought to the notice of the physician, or from being altogether concealed in the breasts of those who have experienced it, whilst the origin of mental disease in disordered religious feelings is obtruded upon his attention. If the data could be procured, I believe, that it would be certainly found that the very great majority of those who have committed suicide in states of mind which at least very nearly approach, if they do not altogether amount to, insanity, actually either have been of no religion at all, or have entertained a very imperfect and inadequate sense of it; and that religious obligations have often suppressed suggestions of suicide, which would certainly have been committed if these had not been entertained. And further, I believe, that a very large proportion of those who become insane, especially amongst the lowest and most ignorant classes, have fallen into this state from the scope given to their temper and passions, and from other mental causes, deprived of that salutary control, and of those consolations, furnished by the beneficent doctrines of Christianity. The tendency of COWPER to mental derangement was long opposed by the influence of true religious principles; and, in later life, a sense of his duties and obligations arrested his hand in the act of suicide.

296. *B.* PHYSICAL CAUSES OF INSANITY.—The *physical causes* of insanity may be divided into—1st, Those which affect the encephalon chiefly and immediately; 2dly, Those which exhaust organic nervous power, and disorder the general organic sensibility; 3dly, Those which act upon remote organs or parts, with which the brain is disposed to sympathise.—Under the head of physical causes, M. ESQUIROL has arranged *hereditary predisposition*. In treating of the causes of insanity, this should be viewed apart from the exciting physical causes; for, although it often appears to occasion insanity, without any other circumstance being recognised to develop the predisposition, and although it is strictly physical, it still requires, from its nature and influence, an early and separate consideration (§ 251.).

297. *a.* Of *the causes which more directly affect the encephalon*,—*α. Insolation, sun-stroke*, and exposure of the head to great heat, as to the fires of forges, &c., deserve a passing notice. M. ESQUIROL has observed considerable influence from the last of these; and I have known several instances of exposure to the heat of the sun in warm climates, and in hot days in temperate countries, having developed an attack of mania. Cases of this kind partake much of the character of phrenitis, and are actually such in most cases, especially at their commencement; whilst, in others, more or less of congestion takes place, or follows a state of inflammatory action. It is chiefly where a marked predisposition has existed, or moral causes have cooperated with this, that mental disorder is developed, or persists for a considerable period. In some instances, exposure to the sun's rays first produces an epileptic seizure; the derangement of mind either immediately following it, or appearing after several recurrences. These cases more obviously proceed, at first, from the congestion, or vascular turgescence, of the brain or of its membranes, caused by the solar rays. Exposure to the heat of *charcoal fires* has also been observed to cause insanity; the fumes of these fires probably contributing to these injurious effects. The liability of cooks to mental disorder, which has been remarked on the Continent especially, is probably attributable to this cause.

298. *β. Frequent or habitual determinations of blood to the head*, and *congestions of the brain and its membranes*, are amongst the most common physical causes of insanity, especially when an hereditary disposition to it exists; but, frequently, some fully developed or specific organic malady

of the brain appears before the effect upon the mind is manifested, — especially *apoplexy* and *paralysis*. In these latter cases, softening of a portion of the brain, or hæmorrhage in some part of it, or both lesions, with various attendant changes, are the more immediate effects, and upon these the mental disorder is only contingent in some instances. When mental disease follows apoplexy, some form or other of paralysis is often associated with it. The varieties of mental disorder consequent upon *apoplexy*, or upon *paralysis*, or upon both, are chiefly the several grades of dementia, and forms of partial insanity; but any other variety may also proceed from them. (See art. Apoplexy, § 52. *et passim.*)

299. *γ*. *Epileptic* and *convulsive affections* are, perhaps, more frequently productive of insanity, and especially of the several grades of dementia (§ 155, 156.), than any other disease, unless, perhaps, *apoplexy* and *paralysis*. M. Esquirol states, that of 300 epileptics in the Salpêtrière more than one half are insane. It may be supposed that the influence of epilepsy in causing insanity depends chiefly upon congestion of blood on the brain, or vascular determination to it; but this inference may be only partially correct; for, even admitting that these lesions of the cerebral circulation are present in many epileptic cases, it does not follow that they exist in all of them. I believe that it will be found, that when epilepsy is connected with, or depends upon, a deficiency of blood, and great impairment of nervous power (see art. Epilepsy, § 27.), that it is more apt to be followed by insanity than when attended by either congestion, or determination of blood to the brain. M. Esquirol remarks that, although epilepsy and convulsions are often causes of insanity, especially of furious mania and dementia, that *vertigo* still more frequently precedes, and is more destructive to the mental powers than they. I believe that vertigo more frequently proceeds from an impaired circulation in the brain, conjoined probably with weakened organic nervous energy of this organ, than from opposite states of the circulating and nervous system. — *Cataleptic* and *ecstatic* affections, and *somnambulism*, may also lapse into mental derangement; or, in other terms, the states of nervous influence and of cerebral circulation, causing these affections, may be only early stages or grades of the same physical disorder of which insanity is the consequence.

300. *δ*. *The transference or metastasis of disease to the encephalon*, is a not infrequent cause of insanity, especially where a predisposition to it exists. The sudden disappearance, or the suppression, of cutaneous eruptions, of accustomed discharges and evacuations, and of certain painful or constitutional maladies, has often been followed by mental disease. Cases illustrative of the production of inflammatory and other diseases of the brain, and of the various forms of insanity, from these causes, abound in all practical medical works. The suppression of herpes, of scabies, and of other chronic cutaneous eruptions, — of various discharges, as leucorrhœa, chronic diarrhœa, &c.,— of hæmorrhagic evacuations, as epistaxis, hæmorrhoids, menorrhagia, — and of gout and rheumatism, — has frequently been followed by insanity, and especially by mania, and melancholia, either in their simple forms, or complicated with paralysis or epilepsy. Where the mental disorder thus supervenes, distinct evidence of acute or subacute inflammation of the brain or of its membranes, or of both, is often evinced for some time before the mind becomes disordered.

301. *ε*. *Inflammatory and other diseases of the brain* are frequently followed by mental derangement. The delirium symptomatic of these maladies, and of fever with predominant affection of the brain, may subside into one or other of the forms of partial or general insanity; and the various organic lesions occurring in the encephalon and its membranes may be attended, at an early stage, with more or less mental disorder; or, after having given rise to epilepsy, paralysis, or apoplexy, may be followed by such disorder. In such cases, however, the mental affection is to be viewed rather as a contingency, than as a necessary consequence of the organic disease.

302. *ζ*. *Injuries of the head* are sometimes productive of insanity; owing chiefly to chronic or slow inflammatory action, and its consequences in the brain or membranes. In some cases, acute disease, attended by delirium, is the first effect; but, consequent upon this, any grade of chronic insanity may appear. Occasionally, even, the mental affection does not occur until years have elapsed from the receipt of the injury; and it then may present every grade of severity, and may even be associated with epilepsy or paralysis. During the long interval that may thus elapse, various symptoms, referrible to the encephalon, are generally complained of, and are sometimes so manifest to the physician, as to lead him to dread the impending calamity, and to employ means, which as often fail as succeed in averting it. Dr. Prichard remarks, that there are instances in which a slight peculiarity of character, not amounting to insanity, has remained long, and perhaps through the life of the individual, who has sustained a severe injury of the head. Sometimes this amounts to a kind of moral insanity; the temper being more irritable, and the feelings less under restraint, than formerly. In other instances, there have been greater energy and activity, more of excitement in the general character, which have been thought a change for the better, rather than a morbid alteration. Of this, two remarkable cases have come under my own observation. Van Swieten, Haller, and others have adduced instances of congenital and puerile imbecility having been removed by injuries on the head; and Dr. Prichard mentions a family, consisting of three boys, all idiots, one of whom, having received a severe injury on the head, had his faculties restored, and became a professional man of good talents.

303. *b*. *Whatever greatly exhausts organic nervous power*, both predisposes to, and directly occasions, insanity. — *a*. Many, however, of those causes, which thus affect nervous energy, favour congestion on the brain, and occasion disease of other vital organs, tending to disorder the functions of the brain sympathetically. Of these, the most influential are masturbation and libertinism, or sexual excesses, sensuality in all its forms, and inordinate indulgence in the use of intoxicating substances and stimulants. The baneful influence of the *first* of these causes is very much greater, in both sexes, than is usually supposed; and is, I believe, a growing evil, with the diffusion of luxury, of precocious knowledge, and of the vices

of civilisation. It is even more prevalent in the female, than in the male sex; and in the former it usually occasions various disorders connected with the sexual organs,—as leucorrhœa, displacement of the uterus; difficult, or disordered, or suppressed, or profuse menstruation; both regular and irregular hysteria, catalepsy, extasis, vertigo, various states of disordered sensibility, &c., — before it gives rise to mental disorder. In both sexes, epilepsy often precedes insanity from this cause; and either it or general paralysis often complicates the advanced progress of the mental disorder, when thus occasioned. Melancholia, the several grades of dementia, especially imbecility and monomania, are the more frequent forms of derangement proceeding from a vice, which not only prostrates the physical powers, but also impairs the intellects, debases the moral affections, and altogether degrades the individual in the scale of social existence, even when manifest insanity does not arise from it. Sexual excesses, and libertinism in persons predisposed, hereditarily or otherwise, have a similar effect to the former cause, although neither so frequently nor so certainly; the mental disorder generally assuming the same forms and morbid associations as have just been mentioned.

304. *β. Intoxicating substances and stimulants* are causes of mental disorders in most countries; but they are among the most influential of all the exciting causes in the lower classes, particularly in the United States of America, in Great Britain and Ireland, and in Germany. In France, Italy, and Spain, this vice is much less frequent. Spirituous liquors are the most generally indulged in; and are the most injurious in their effects, not only on the nervous system, but also upon the digestive and excreting organs. A large proportion of the admissions into pauper lunatic asylums arise from this cause, especially in large cities and manufacturing towns and districts. Mania, monomania, and melancholia most frequently proceed from the abuse of intoxicating liquors; and the cases which are thus caused, are amongst those which are oftenest cured — at least, for a time. The removal of the cause, and the use of sedative means, generally cure the attack: but relapses or recurrences are more frequent in these, than in any other class of cases.

305. The excessive use of opium is as injurious to the nervous energies, and to the mental powers, as addiction to spirituous liquors; but the ill effects resulting from it on the mind, are not often observed in this country. — I have known several instances, all of them females, of the acetate of morphia having been used, instead of opium, as a restorative and intoxicating agent. It was ultimately more or less injurious in all; and in one, partial insanity, with suggestions of suicide, appeared, — but probably other causes contributed to the morbid effect.

306. *γ*. The abuses of *mercurials*, and particularly of *calomel* as a common or frequent purgative, has, in several instances in which I have been consulted, been productive, first of depression of the nervous power, and of a morbidly increased state of the general sensibility, and subsequently of melancholia and other forms of monomania. A surgeon, a pupil of the late Dr. CURRIE, was in the habit of taking large doses of calomel, at least twice, but more frequently oftener, in the week. He believed himself subject to disease of the liver, resorted to this medicine when he found his spirits greatly depressed, and considered that he was better the day after taking it. He persisted in the frequent use of calomel, and became more and more nervous and hypochondriacal. He was afterwards melancholic, entertained mistaken views of religion, and attempted suicide, which he accomplished in a subsequent attempt. — The daughter of a clergyman in this city was attended by this surgeon, and had very frequently taken large doses of calomel. Her health and spirits had become remarkably impaired, and her intellects disordered. There was no hereditary predisposition to insanity in either side of the family. She had been fond of company and amusements; but was melancholic, physically out of health, tormented by the most distressing religious fears, and refused being seen by her relatives and former friends, when I was directed to visit her. Her despondency, mental misery, and religious delusions were remarkable; and she had frequently contemplated suicide, in order to terminate her suffering. She completely recovered under a restorative treatment, aided by change of scene and of air, and by suitable moral management.

307. *δ. The too frequent or excessive use of colchicum*, for the removal, suppression, or prevention of gout, has given rise to insanity in three instances in which I was consulted. In one of these, melancholia was the more immediate disorder of the mind; in the others, incoherence and imbecility, with illusions, were the consequences. — All powerful *depressants*, and even *cold*, either excessive in grade, or prolonged in its operation, may occasion insanity, by their operation on the nervous power.

308. *ε. Excessive or prolonged lactation*, relatively to the patient's strength, profuse evacuations, particularly leucorrhœa, frequent menorrhagia, profuse hæmorrhoidal discharges, &c., have also induced melancholia, and other partial forms of insanity, and even imbecility, or more complete dementia, chiefly by exhausting the vital powers, especially of the nervous system. It will afterwards be shown, that *puerperal insanity* is occasioned partly by this cause, or rather by the evacuations consequent upon parturition, in connection with previous suffering, and increased susceptibility of the nervous system. Something also may be imputed to the altered state of the general circulation, and of the condition of the uterine organs.

309. *c. Diseases of Organs with which the Brain more or less sympathises*, not infrequently cause insanity, when a predisposition to it already exists. So intimately associated in function are all the organs of the body, through the numerous bonds of union furnished by the organic nervous and vascular systems, that serious disease seldom exists in either, without the functions of one or more of the others being remarkably disturbed: and when visceral disease occurs in a person who has an hereditary or an acquired predisposition to mental disorder, the former is often the cause of the development of the latter; various other circumstances, however, moral and physical, often co-operating with this cause, in the production of the morbid effect upon the mind. — Of this class of physical causes, habitual constipation, inflammatory irritation of the gastro-intestinal mucous surface, diseases of the heart and lungs, functional

disorders and organic lesions of the uterus, and diseases of the biliary and urinary organs, are the most important. It is chiefly when these visceral maladies appear in an obscure and insidious manner, and proceed slowly, that the functions of the brain become disordered in a chronic form.

310. α. Without attributing nearly so much influence, as M. Broussais has done, to inflammatory irritation of the *gastro-intestinal mucous surface*, it cannot be denied that its pre-existence is of considerable importance in the production of the mental disorder. But it is very seldom the sole physical cause in these cases; most commonly, exhaustion or depression of the organic nervous influence co-operating with it in producing the effect upon the mind. The disorder of the digestive organs is generally caused, by the excessive use of stimulating and indigestible food, among the opulent; and by constipation, intemperance, unwholesome food, and by cold and want, among the lower classes. In these cases, hypochondriasis, or hypochondriacal melancholia, first appear; and various forms of general insanity supervene.

311. β. Severe functional and organic disease of the *heart* or *lungs* may excite insanity in the predisposed, owing to disorder of the circulation in the brain, consequent upon interruptions of it in these organs. — When mental derangement follows diseases of the *biliary* or of the *urinary organs*, it may proceed more immediately from the influence on the brain of the excrementitial matters accumulated in the blood, in consequence of the impaired or disordered function of these organs.

312. γ. Of the operation of the functional and organic affections of the *uterine organs*, but little need be here added to what has already been observed. In these cases, the sympathetic effect takes place, most probably, by the propagation, to the spinal cord and brain, of irritation originating in the sexual apparatus; and the mental disorder is generally preceded and attended by one or more of the numerous forms of hysteria, or by epilepsy, and sometimes also by hypochondriasis, or great lowness of spirits. This is especially the case when the catamenia are difficult or suppressed. In many cases, not only uterine disorder, but also gastro-intestinal irritation, is accessory to the causation of the mental disease.

313. In considering the operation of all these physical causes, it should not be overlooked, that it is often extremely difficult to determine, whether the disorder originates in the brain — the other organs sympathising with it, — or whether the disturbance of the mental powers is altogether owing to disease of viscera remote from the encephalon. But, however difficult it may be, an attentive examination of the history and existing symptoms of the case should be instituted, to the determining of this point; as much of the success of treatment will depend upon correct views regarding it.

314. δ. When organic nervous or vital power is much depressed, especially in respect of the digestive and excretive functions, *accumulations of morbid secretions, and collections of fæcal matters*, are liable to form in the intestinal canal, and particularly in the *cæcum* and *colon*. These dilate, displace, irritate, and obstruct the bowels; occasioning flatulent distension, spasm of the muscular coats, and various disorders of the whole tube, as well as of the collatitious viscera. These morbid accumulations are apt to occur even in persons who suppose their bowels perfectly open and regular; and they more certainly take place in those who are habitually costive or constipated. The effects, however, of collections of morbid secretions in the bowels, — particularly in the large bowels, — are not limited to these, or even to the adjoining viscera; although, if even thus limited, they would often be sufficient to excite, by the intimate sympathy existing between the digestive organs and the brain, functional disorder of the latter, especially in persons already disposed to such disorder. But there is every reason to believe, that when morbid or fæcal matters accumulate in the intestines, either with or without constipation, the chyle thereby becomes more or less impure or contaminated, and that a portion of these matters is absorbed into the circulation, the blood being consequently altered, and a state of general cachexia being thus produced. Where the predisposition to insanity already exists, the morbid materials conveyed into the blood will be often sufficient to derange the functions of the brain; and, not infrequently, this consecutive derangement will not be limited to these functions, but will extend to several others.

315. The sympathetic influence of the digestive organs on the brain, in connection with the deterioration of the chyle, and the absorption of excrementitious matters from the bowels into the blood, will in this manner occasion hypochondriasis, melancholia, partial and general insanity, and, ultimately, even some of the complications which these occasionally present. The displacements and dilatations of the colon so often observed in melancholia, and sometimes also in other disorders of mind, most probably result from frequent or habitual constipation, even previously to the appearance of mental derangement. And the inflammatory irritation of the gastro-intestinal surface, already noticed (§ 310.) as causing and attending many cases of insanity, is probably the more immediate effect of the impaired energy of the digestive canal, and of the accumulation in it of morbid matters; the consequences as respects the chyle and the blood, just contended for, increasing the effects upon the functions of the brain. The influence of constipation, or even of habitual costiveness, in causing insanity, and the good effects of powerful purgatives in the treatment of it, were well known to the ancients, and to most of the older writers; and, though fully recognised in this country, have been imperfectly estimated on the Continent in recent times, and even erroneously viewed by many, and particularly by Broussais and his disciples.

316. ε. Besides the above physical causes, *pregnancy*, the *accumulation* of morbid matters in the intestinal canal, and *of bile* in the biliary apparatus, the presence of *worms in the bowels*, *hypochondriasis*, and *hysteria*, frequently give rise to insanity. The abuse of medicines, and of all substances which act powerfully on the nervous system, and especially of green tea or of coffee, is occasionally, also, a cause of mental disorder.

317. ζ. M. Esquirol (*Mal. Ment.* t. i. p. 64., et t. ii. p. 682.) has given the following *tables of the causes of insanity*; — the *first* comprising only the physical causes among female cases; the *second* embracing both physical and moral causes in cases of both sexes at Charenton.

Physical Causes.	Salpêtrière.	M. Esquirol's Establishment.
Hereditary predisposition - -	105	150
Convulsions of the mother during gestation - -	11	4
Epilepsy - -	11	2
Disorders of the catamenia - -	55	19
Consequent on lying-in - -	52	21
Critical age - -	27	11
Progress of age -	60	4
Insolation - -	12	4
Injuries of the head	14	4
Fevers - - -	13	12
Syphilis - -	8	1
Mercury - -	14	18
Intestinal worms -	24	4
Apoplexy - -	60	10
	466	264

Causes, Physical & Moral.	1826.	1827.	1828.	1829.	1830.	1831.	1832.	1833.	Total.
Hereditary predisposition -	19	19	58	65	70	36	38	34	337
Masturbation - - -	7	9	7	7	10	3	3	6	52
Libertinism and excesses of all kinds - - -	8	8	8	12	25	15	33	37	146
Abuse of mercury - -	3	3	10	13	6	5	1	3	44
The abuse of spirituous liquors - - - -	22	17	25	11	16	10	18	15	136
Insolation, &c. - -	0	5	2	1	2	0	2	0	12
Injuries on the head -	1	1	2	9	3	2	1	1	20
Suppression of accustomed evacuations - - -	5	4	4	13	3	12	7	6	54
Suppression of habitual suppuration - -	0	0	0	0	1	0	2	0	3
Consequent upon parturition - - - -	2	3	5	8	1	2	3	4	28
Cerebral affections - -	0	0	0	0	0	6	6	5	17
Epidemic cholera - -	0	0	0	0	0	0	3	0	3
Domestic distresses, &c. -	38	22	29	26	47	38	40	38	278
Excessive study and watchings - - - -	2	3	3	2	2	1	2	1	16
Reverses of fortune - -	7	7	6	5	3	15	2	4	49
Gambling - - -	0	0	2	0	1	2	0	0	5
Jealousy - - - -	3	2	8	3	0	1	1	0	18
Disappointed affection -	12	9	8	2	3	1	2	0	37
Wounded self-love - -	4	1	1	2	3	2	2	1	16
Fright - - - -	1	0	4	8	14	5	2	1	35
Exalted devotion - -	7	9	2	1	3	1	1	0	24
Excessive joy - - -	0	0	1	0	1	0	0	0	2
Reading romances, &c. -	3	3	7	0	0	0	0	0	13
Political events - -	0	0	0	0	13	15	3	1	32
									1375

318. M. Esquirol remarks, that the causes were often ascertained with much difficulty; as the patients themselves were generally incapable of assigning them, and the friends could not always do so — at least, with any degree of precision. It is probable, however, that two or more causes were concerned in producing the effect, and that various circumstances were omitted; he considers that hereditary predisposition is much more frequent than stated in the above table. Under the head of domestic distresses, are included all the moral affections which are called into action in the interior of a family. The political changes in Paris, in 1830, gave rise to the cases from this cause, and to those produced by frights.

319. *n. Sol-lunar influence* was very generally supposed to excite or to favour the appearance of insanity, as well as to cause exacerbations of the malady. M. Esquirol could not verify this opinion by the results of his experience. It is probable, however, that electrical states of the air, or sudden vicissitudes of the atmospheric electricity, in connection with similar changes in the electrical currents through the body, have some influence on this malady. The effects of excessive cold and of great heat in causing madness, and the excitement produced in lunatics by atmospheric commotions, are indications of this influence. However this may be, there can be no doubt of marsh miasmata being a not uncommon cause of insanity, and especially of melancholia and dementia.

320. *C.* Various circumstances arising out of the manners and social and political states of a community may increase the frequency, or contribute to the production, of insanity. Still, these states are more or less connected with the affections of the mind and the other moral causes, or are resolvable into them. — *a.* The social conditions resulting from prevailing modes of education have been considered by M. Esquirol as most influential in increasing the numbers of the insane. Too much care is taken to cultivate the mind, not considering that the affections of the heart require equal care. In all classes, an education is bestowed upon the young, above what is suitable and proper to their station in society; and hence sentiments of ambition, and of discontent with their condition, are instilled into their minds from childhood. This early and ambitious education raises the mind of the young above, and too often in opposition to, the experience of their parents; and hence the opinions of the latter are despised or neglected. A person who has not been duly controlled in childhood is ill able to endure the vicissitudes and reverses to which an active life exposes him in the present state of society, — his passions being thereby deprived of a salutary curb, and his reason of its surest props, insanity often follows upon the least adversity. The manner of living in the easier classes of society,—the passion for dress, for exciting romances, for intrigue, for frivolities and amusements, — engender a constant thirst for excitement, and increase the frequency of nervous complaints and mental disorders. The vices, and the miseries and privations consequent on these vices, in the lower grades of society, have a no less marked influence in causing the latter of these effects more especially.

321. *b.* In country districts, the prevailing passions are less turbulent and exciting than in cities and large towns. Love, anger, and domestic contrarieties are the most frequent moral causes of mental disorder in the former; whilst, in the latter, ambitious views, speculations, disappointed hopes, reverses of fortune, excessive mental labour, watchings and late hours, greater depravation of manners, and more vicious indulgences, are added to these; and, consequently, insanity is more prevalent in populous, commercial, and manufacturing towns, than in rural places. In proportion as the latter causes are prevalent in any community, and are aided by a more or less general propensity to drunkenness, or to libertinism, or by the vices of education, and of conduct in the richer classes, and by the want of both in the lower orders, so do the disorders of the mind become more frequent.

322. *c.* Even *forms of government* have considerable influence in contributing to this result. There is not the least doubt of the ill effects of a too great freedom of public opinion and acts, and of public writing and speaking, upon mental sanity. With the freedom of opinion, and the latitude allowed to the expression of it, without re-

gard to the feelings and the interests of individuals, or to the morals and sympathies of the community, those emotions which most seriously disturb the mind, are brought into the most violent and distressing action, and the calm dictates of reason thereby overthrown. The political strifes, the popular elections, the borough and parish contentions, in this country, and in the United States of North America, furnish sufficient proofs, to the candid mind, of the truth of this position. The exciting, the contaminating, and the disgusting occurrences and circumstances, which daily, and even hourly, are placed before all classes in society, in most exuberant variety and particularity of detail, — the moral poison with which the whole is garnished, in the lowest, the cheapest, and the most diffusible of these vehicles of abominations, and of mental infection, — the liberty which contaminates the innocent, demoralises the public, injures the feelings, and benefits only the worthless and the base, — all tend to the consummation of the injurious effect upon the mental health of the community — to the increase of crime, of madness, and of suicide.

"Here, by the bonds of nature feebly held,
Minds combat minds, repelling and repell'd:
Ferments arise, imprison'd factions roar,
Repress'd Ambition struggles round her shore:
Till, overwrought, the general system feels
Its motion stop, or frenzy fire the wheels."

323. *d. Political commotions*, by exciting revenge, and the more violent passions of the public, by fomenting ambition, by rousing to intellectual exertions, and by overturning fortunes and the established order of things, have a marked influence in augmenting the frequency of insanity. The frights, terrors, outrages, distresses, and losses of fortunes, of friends, of honour, &c., consequent upon foreign invasions, sieges, and civil and domestic wars, are most fruitful causes of derangement on these occasions. Numerous proofs of this have been adduced by the French and German writers since the last war. Revolutions moreover do not only greatly increase the numbers of the insane, but also impart certain characters to the prevailing mental disorders. M. Esquirol observes, that, when the ancient monarchy was destroyed, many became mad from the loss of fortune and friends, and from the frights and terror caused by the consequent anarchy. When the Pope came to France, religious insanity was most frequent; and when Napoleon made princes and kings, insanity from ambition and pride was frequent, and kings and queens were numerous amongst lunatics. Religious revolutions have a similar influence; and even the prevailing ideas called into existence or activity by these revolutions, by great political events, and by popular commotions, contribute both to the frequency, and to the character, of this disorder. The prevalence and features of madness, during the Crusades, and for long afterwards; during the Reformation, in Germany, the Low Countries, and Great Britain; and during the civil wars, and the temporary domination of puritanism, under the long parliament and Cromwell; are illustrations of what I have just advanced.

324. *e.* M. Esquirol states, that a sedentary, indolent, or inactive mode of life favours the occurrence of insanity; and that persons who have been accustomed to a very active life, as merchants, traders, professional men, and soldiers who have led an irregular and an eventful life, are liable to this malady when they settle to the enjoyment of wealth and splendour.

325. *f.* Another circumstance of great importance presents itself in the relative frequency of insanity in the *married* and *single*. The following *Table* contains the results furnished on this subject by Esquirol, Desportes, Jacobi, and Prichard: —

	DESPORTES.		JACOBI.		ESQUIROL.	
					Charenton.	
	Salpêtrière. Females.	*Bicêtre.* Males.	Females.	Males.	Females	Males.
Unmarried - -	980	492	599	974	193	505
Married - - -	397	201	156	176	363	387
Widowers and Widows	291	59	80	30	69	40

The differences in these results depend much upon the classes of persons admitted into the institutions from which these results are obtained, and upon the limitations observed as to admission. Still, enough is proved by them to suggest important considerations connected with the hygiene and prophylaxis of insanity. With respect to the results which are here adduced, Dr. Prichard observes, that, as it appears probable that celibacy tends to augment the numbers of lunatics, an inquiry is suggested as to the manner in which this result ensues. Is it through the restraints which the condition of celibacy imposes, or through the vices to which unmarried persons are more frequently abandoned? M. Esquirol is of opinion, that, where one case of insanity arises from the former cause, a hundred result from the latter. A case occurred to me some years ago, of a well-educated man, hereditarily disposed to insanity, who, after long periods of continence, experienced symptoms premonitory of mania. He married soon after, having been under my care. Several years have since elapsed, without any indication of mental disorder having appeared. Persons happily married, generally lead more regular lives, in all respects, than the unmarried, and are more fixed in their pursuits and employments. In many other respects, also, the condition of married persons is much less favourable to the excitement of madness than that of celibacy.

326. In taking a survey of the feelings, the emotions, and the passions, as well as of the numerous circumstances connected with the social states, productive of insanity, the conclusion is irresistible, that the diminution of its frequency depends more upon the constitution of individual minds, proceeding from habitual control, and from a due exercise of moral and religious principles and obligations, than upon all other circumstances combined.

"Vain, very vain, the weary search to find
That bliss which only centres in the mind.
In every government, though terrors reign,
Though tyrant kings and tyrant laws restrain,
How small, of all that human hearts endure,
That part which laws or kings can cause or cure!
Still to ourselves in every place consign'd,
Our own felicity we make or find:
With secret course, which no loud storms annoy,
Glides the smooth current of domestic joy.
The lifted axe, the agonising wheel,
Luke's iron crown, and Damien's bed of steel,
To men remote from power, but rarely known,
Leave reason, faith, and conscience, all our own."